



FRIDAY, MARCH 5, 1880.

Contributions.

Erratum.

PUEBLO, Col., Feb. 25, 1880.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of Feb. 13, 1880, page 88, my attention has been called to errors in some of the formulae, by S. W. Lee, of this office. The following are correct:

$$c = \frac{g}{\sin \frac{1}{2} F} = \sqrt{2 R g + g^2} = 100 \sqrt{\frac{g}{T D}}$$

$$c' = \sqrt{\frac{1}{2} g c^2} = \sqrt{\frac{1}{2} c^2} = 100 \sqrt{\frac{1}{2} \frac{g}{T D}} = 0.707 c.$$

$$s = \sqrt{\frac{c^2 t}{g}} = 100 \sqrt{\frac{t}{T D}} = \frac{1}{2} \frac{0.297 c}{\&c. \&c.} \text{ See p. 88.}$$

$$F = D \sqrt{\frac{g}{T D}} = \sqrt{\frac{g D}{T}} = \frac{1}{2} \text{ length of curve from heel to point } \times D.$$

$$\frac{1}{2} F^2 = D \sqrt{\frac{1}{2} \frac{g}{T D}} = \sqrt{\frac{1}{2} \frac{g D}{T}};$$

and F^2 = length of curve from heel to point (of crotch frog) $\times 2 D$.

The formulae appeared in the GAZETTE as sent. They were not copied correctly to send you.

The origin of the above formulae is due to Mr. Lee. The switch tables accompanying them have proved to be reliable in every case. ***

Address of Mr. A. L. Holley, at the Mechanical Engineers' Meeting.

After being called to the chair and acknowledging the compliment, at the meeting, Feb. 14, for the organization of the American Society of Mechanical Engineers, Mr. Holley said:

GENTLEMEN: Before entering upon the details of organization, we should briefly consider the magnitude and the character of the work we are assembled to undertake; and what I shall say will, perhaps, only formulate and emphasize your own views, as you have thought in advance of this meeting and of its objects.

It seems very remarkable that an Institution of Mechanical Engineering—which underlies all engineering—has not long ago been organized in this country of mechanical engineers. Probably, however, the work will be perfected sooner than if it had been begun earlier, because the material for active membership is now more abundant, and the importance and the methods of successful organization are better known.

We define engineering as the science and the art of utilizing the forces and materials of nature; and we observe that this utilization is accomplished in all or nearly all cases, either directly by machines, or by processes working through machines. I confess that in thinking over the range of mechanical engineering, with reference to our proposed society, I was astonished at its magnitude; I had never realized it before. In that branch of the profession distinctively called civil engineering, and pertaining to fixed works, how largely mechanical engineering underlies both the structure and its uses. Take the canal; it is built by the steam-dredging machine, the machine-drill, the steam-pump, the steam-derrick, the temporary railway with its locomotives and cars. The completed canal is operated by the boat which is equally machine-built, and usually steam-propelled. The masonry fort and the masonry light-house are essentially military engineering works, but, however much science their planning may involve, their construction is mechanical engineering, by means of the machine-drill, the steam-derrick and steam transportation.

In bridge-building, the expert tells us that the strain-sheet is not now the difficult matter, and that success chiefly lies—first, in good methods of joining the parts with reference to strain and expansion, and second, in the adaptation of special tools and facilities for shaping and preparing the work cheaply, and without injuring it. This is all mechanical engineering.

I would not underrate—I cannot too highly magnify the wide and profound scientific knowledge employed in locating and planning these vast works of civil engineering—the canal, the harbor, the railway, the tunnel, the pier, the breakwater—I only emphasize the fact that our own profession of mechanics and dynamics underlies their construction and utilization; it is the intermediate power between nature on the one hand, and the artificial structure and the artificial work done on the other hand.

Passing now to that immense department of engineering—mining and metallurgy, it is almost astonishing to find how completely mechanical means and processes produce its results. Geological exploration of the most highly scientific character is essential, but the hydraulic engine, the machine-drill, the steam-pump, the steam-hoist and steam transportation perform the work.

In metallurgy, a few characteristic examples show the universal imprint of our profession. The analyses of ores, fluxes and slags are indeed indispensable, but it is the elaborate machinery of steam-blowing, steam hoisting and transportation, and the vast mechanism of heating apparatus, that produce pig-iron. The furnace, of whatever kind, the hot-blast stove either of pipes or of bricks, the gas-producer, the regenerator—in short, fire-brick construction at large is an important department of mechanical engineering. The Bessemer process is the grandest exhibition of practical chemistry to be seen in the world, but, as in invention, it is essentially mechanical, and the means of carrying it out involve elaborate and ponderous mechanism at every step—the thousand-horse blowing-engine, the hydraulic lifting and moving apparatus, the interchangeable parts.

The rolling mill is throughout a series of machines, and much of their work is of the most difficult character; it has been improved by the highest mechanical ingenuity and experience, in many countries, and is still but on the threshold of its possible development. It involves the adaptation of steam-engines and boilers under peculiar environment; of roll trains, which are by themselves a vast department of engineering; of power-handling, finishing and transportation, and of the utilization of fuel under varying circumstances and on a gigantic scale.

We need not dwell on the similar relations of mechanical

engineering to the foundry, to the forge, and to such immense specialties in iron and steel, as wire, horse-shoes, bolts and nuts, springs, agricultural tools, cutlery and hardware at large. What thousands of special tools and machines picture themselves in our minds as we contemplate such manufactures as these?

The railway in structure and working is all mechanics and dynamics, however great may be the civil engineering ability displayed in its location and in the designing of its fixed works. Railway master-mechanics form, perhaps, the largest defined class of mechanical engineers, and the chief engineers of railways, in their chief work of permanent way and bridge construction and maintenance, deal chiefly with our department of the profession.

The locomotive-builder is called to practice mechanical engineering of the most refined and comprehensive type—the economical generation and use of steam in an almost flying vehicle of minimum weight and maximum power. And the number of his works is measured by tens of thousands. Does not the car-builder also deal with machines on the most comprehensive scale—the innumerable wood-working tools and his special appliances for iron work? And speaking of wood-working tools, what vast mechanical ingenuity has been brought into service, and what vast interests are represented in the manufacture of wood in all constructive and ornamental forms, especially in the immense department of furniture.

In those leading departments of industry, which, at first thought, the public would deem quite outside of mechanical engineering, how completely is this art incorporated with their every detail. The manufacture of textile fabrics is a conspicuous example. However indispensable chemical guidance may be, the whole complex system, including the application of chemistry, is mechanical. The same is true of those vast departments of industrial art, the glass manufacture and more conspicuously the manufacture of paper. And is it not equally true in the case of gas-making and electric lighting, of pottery and brick making and of chemical manufactures at large?

What shall we say of architecture? There are the strictly æsthetical and mathematical elements, but the construction—quarrying and shaping, foundry and forge work, excavating and hoisting, are mechanical. Should the architect and the civil engineer say that the mere molding and assembling of members is not worthy of a professional name and status, the mechanical engineer may reply that the mere calculation of strains from known formulae, and the mere grouping of conventional forms, is no more worthy. The genius that reaches the harmony of perfect construction and perfect beauty (which are interchangeable terms), in Nature's inert materials, may not be loftier than that which as perfectly utilizes and governs her wild and capricious forces.

Modern agriculture is but a world-wide arena for the operation of machines, and these machines, and the machines that produce them, draw upon many departments of mechanical engineering.

National defenses, other than old-style forts, are among the most conspicuous types of machines, for the modern war-ship, the modern gun, and the modern small arm are nothing but machines of the highest classes. The almost incredible endurance and accuracy of modern ordnance have been achieved, as their grandest work, by mechanical engineers who were most successful in other departments of their art. Ship-building, even more than bridge-building, is conspicuously within the range of our profession.

But if the works and industries we have enumerated are the results of our mechanical and dynamic science and art, what shall we say of the steam boiler and engine—the adaptation they involve, of materials to the economical utilization of force—of machines to the economical production of complex energy? This greatest department of mechanical, and purely mechanical, science is alone a sufficient basis for the establishment of such an institution as that we have assembled to organize.

In this briefly referring to the leading types of work in our profession of mechanical engineering, and in enumerating many, but by no means all, of the great industrial and structural arts in which the aid of our profession is conspicuous, if not vital, I suppose that I have only formulated your own thoughts, and I imagine also that your review of the scope of our profession was as surprising to you as it was to myself.

We should also briefly consider the advantages and character of our proposed organization:

1st. The most obvious advantage is the collection and diffusion of definite and much-needed information, by means of papers and discussions. The transactions of such societies are now about the only records of our rapidly-changing applications of science. In my own department, for instance, I am often asked to name a book on modern iron and steel manufacture, but I know of no satisfactory book. The monographs in the various transactions and technical magazines, are the current literature of industrial art.

2d. A less obvious, but, it seems to me, a more important advantage of organization, is the general personal acquaintance thus promoted, and by no other means promoted, among engineers and the business men associated with them. It is not only a reasonable supposition, but it is a matter of history, that men in the same business, thrown together in technical and social meetings, in excursions and among engineering works, gradually, and often quickly, exchange friendship for jealousy, and helpfulness for rivalry. The grandest work of the British Iron and Steel Institute has been to throw open the works and processes not only of England, but of France, Belgium and Germany, to the observation of all who are interested. It is being found out that fifty men can impart more information to one man than the one can impart to the fifty; and the one is only too glad to show his hand that he may see a much larger number. This free exhibition and information is not without bounds, nor should it be; but the old conservatism has passed away.

3d. The habit of writing and discussing technical papers is of very great importance. It engenders habits of thought at once rapid and accurate. Any man can work better who can formulate the merits and defects of work.

The kind of organization, especially the criterion of membership, is a most important consideration. In the American Institute of Mining Engineers, and in the Iron and Steel Institute of Great Britain, any one is qualified who is engaged in mining and metallurgy. The advantages of the association of business men with engineers in these societies are notorious; these advantages are not only large memberships, and hence large incomes to devote to publications and illustrations, but they lie chiefly in the direct business results of bringing professional knowledge, capital, and business talent together under the most favorable circumstances.

In most of the civil engineering societies, the aim is not only to promote knowledge by means of papers and discussions, but to establish such a high professional standard of eligibility that membership shall be recognized as an endorsement.

Now it seems to me that all these ends can be attained in one society by simply calling professional men members, and fixing a high standard of qualification; and by an equal discrimination among applicants, making those associates who are fitted by scientific or commercial ability and relations to cooperate with engineers. The professional standard is thus maintained, while the other enumerated advantages are

gained. I can see no objection to giving an associate all the privileges of the society except the name of member.

Juniors in professional experience should, as is usual, be provided for by that classification.

Those who have had a large experience in the management of such organizations will, I think, agree with me that the Council of the Society should pass upon the qualifications of candidates, who should then be voted for by the sealed letter ballots of the members and associates.

As to officers, I must detain you with a word. The first officers should be men of distinction in the profession, to give the Society character at home and abroad—and at once. They must also be men who will devote time and money, at first, to the building up of the Society. I am sure that the start of 500 or 1,000 members would be lost if the officers were indifferent—if they had not positive enthusiasm in promoting good papers, good discussions, good meetings, and an interested and working membership. And a good Secretary is the concentration of good management.

Meetings should not be too infrequent. The Society cannot soon have a local habitation. The Mining Engineers and the Iron and Steel Institute have none; but they have three meetings a year in different parts of the country, which give distant members home facilities from time to time, and keep up the Society interest. Frequent local meetings are necessarily small, and often spiritless; members are not stimulated to write or to discuss.

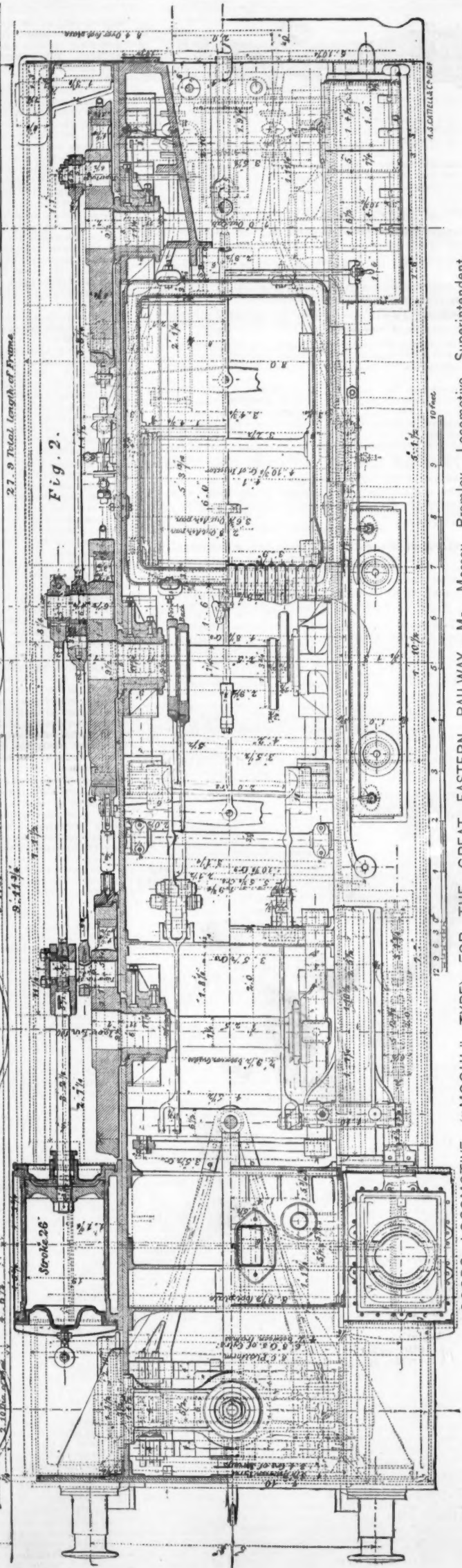
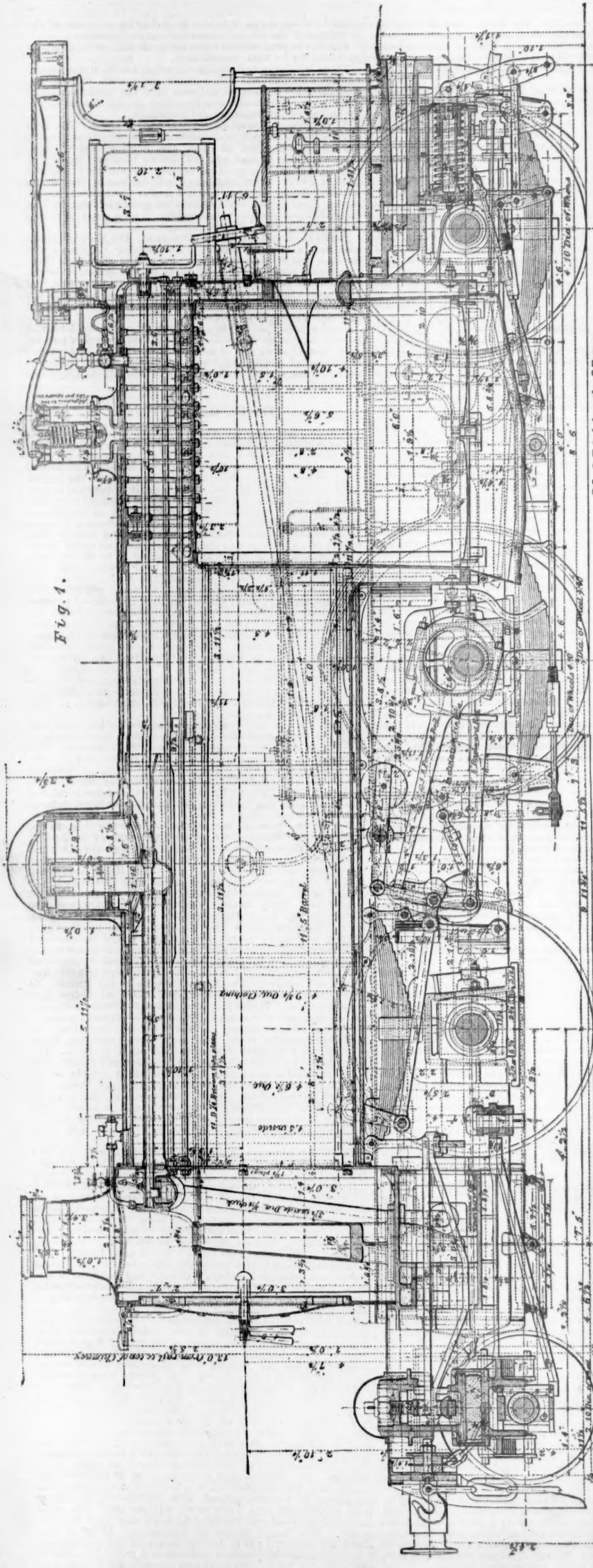
Finally, the rapid and healthy growth of the Society will largely depend on the character of the first few years' papers. With men of work and of note for early officers, and a goodly number of really important and well-written papers at the start, the success of the Society of Mechanical Engineers is assured.

The St. Gothard Tunnel.

Within a few days the laborers who have been excavating the greatest of all railway tunnels, working from both ends, are expected to meet, and within a few months through trains will run from Basle to Milan and Rome. This tunnel deserves more than ordinary attention, partly as the largest work of the kind, and mainly because it is designed to perform for Switzerland what the Hoosac is intended to accomplish for New England. The great object of the Hoosac Tunnel is to establish easier intercourse and cheaper freights between the Atlantic ports of New England and the lake region, the agriculture of the country, and the great West. The function of the St. Gothard Tunnel is to do the same for the trade between Lombardy and Switzerland, between Italy and Germany, between the Mediterranean and the German sea. It was impossible to select any other line for this purpose, even if the St. Gothard line did not propose to be rival of the Mont Cenis Tunnel, the Brenner and the Semmering roads. Two iron roads lead from Italy to Austria, one from Verona to Innsbruck and Munich, the other from Venice to Vienna. Two roads of even greater interest lead from Italy to France, one from Turin to Lyons, the other from Genoa along the shore of the Mediterranean to Nice and Marseilles. It was, therefore, a matter of vital interest to Switzerland, and of considerable importance to Germany, to establish a fifth and independent highway. This is now approaching completion.

There are but few Americans who profess to be familiar with the geography of the Alps; yet it is worth while to point out the central position of the St. Gothard. The natural boundaries of mountains are rivers, and the St. Gothard sends six interesting rivers in as many different directions, and ultimately to the German Sea, the Adriatic and the Gulf of Lyons. From the St. Gothard due northeast runs the Rhine, due southwest the Rhone, both through large and magnificent valleys. Due north runs the famous Reuss, due south the Toce; to the northwest runs the Aar, to the southeast the Ticino. All these rivers are of surpassing interest to the historian, the traveller and the lover of nature. Perhaps it may be pointed out that each of these mountain rivers acquires repose in a deep lake. The Rhine rests in the lake of Constance; the Rhone in the lake of Geneva; the Reuss in the lake of Lucerne; the Aar in the lakes of Brienz and Thun, hence Interlaken; the Toce and the Ticino in the Lago Maggiore, the noblest of all Italian lakes. The situation of the St. Gothard in political geography is equally interesting; it lies where Switzerland cuts deepest into Italy. And in ethnography it separates the German from the Italian idiom. The natural expectation that such a pass would have played a great part in early history is not realized. The disappointment is the greater, as every other road from Switzerland to Italy leads across two passes or more. It was first used by lonely Roman pilgrims, and no mention of it is made before 1293. Hence, possibly, its name, which clearly means "Strong in God," or "Strengthened by God," and may have something to do with Bishop Godehard, who was canonized in 1131. The name is not uncommon in modern English and French. The road remained a mere path until the third decade of the present century, when the cantons of Uri and Tessin constructed the post road, which has inspired so many poets, among them Longfellow, Wordsworth and Schiller. And now the iron engine is to take the place of the post horses, the hospitable inn among the clouds is to be desolate hereafter.

The first conference on the St. Gothard Railway was held Sept. 15, 1869, at Berne. It was attended by Italy, Switzerland and Germany, and resulted in the adoption of a very elaborate scheme representing a total road length of 236.3 kilometres, double tracks not counted, and costing about \$32,000,000. This scheme was afterward enlarged, and it was agreed to have no higher rise than 25 per millimetre, and no larger radius than 280 metres. The engineers prominent in making the first plans and estimates were Grattoni, Director of the Mont Cenis Tunnel, Beckh and Gerwig. The scheme included a bridge across the Rhine, near Basle, several connections with the Lombard Railways, and a number of subsidiary roads. Later on it was found that the early estimates were insufficient; Gerwig was replaced by Hellwig, and on June 4, 1877, a conference at Lucerne adopted new plans which were ratified by the shareholders, the bondholders and the governments. The road, as now contemplated, begins at Immensee, on the western shore of the lake of Zug, touches Schwyz, runs along the eastern shore of the lake of Lucerne, touches Flüelen and Altdorf, runs along the Reuss, enters the tunnel at Göschenen, leaves it at Airolo, runs down the valley of the Ticino, and ends at Pino, a village on the eastern shore of the Lago Maggiore. There it enters Italy and joins the great railway system which centres at Milan. This trunk road has a length of 147.6 kilometres (91½ miles). The subsidiary roads, Cadenazzo-Locarno and Lugano-Chiasso, 39 kilometres long, produce a grand total of 186.6 kilometres, or almost 116 miles, the whole of it in Switzerland. The cost is estimated at 227,000,000 francs, or about \$45,000,000. The shareholders have paid in \$7,000,000; the bondholders \$16,000,000; the rest is paid *a fonds perdu*, as the phrase is, by Switzerland with \$6,000,000, Germany with \$6,000,000, and Italy with \$11,000,000. The contractor of the road was Favre of Geneva, who died but recently. The tunnel begins at Göschenen, 1,100 metres above the sea level; it is 14,900 metres or 9½ miles long; it rises gradually 53½ metres, and ends at Airolo, 1,145 metres above the sea level. The work was begun in 1872, and was



GOODS LOCOMOTIVE ("MOGUL" TYPE) FOR THE GREAT EASTERN RAILWAY.—Mr. Massey. Bromley, Locomotive Superintendent.

to occupy eight years. On the tunnel proper over 3,000 men were constantly employed. For the present, but one track will be laid; but a second track can be added without interfering with travel. The profits on the work will all go to the shareholders and bondholders, the three interested states having merely reserved the right of being represented in the management of the road and the regulation of the tariff. The central office is at Lucerne. The longest railway tunnels in the world are:

The St. Gothard Tunnel.....	14,900 metres.
" Mont Cenis	12,849 "
" Hoosac	7,630 "
" Kaiser Wilhelm	4,200 "

The first railway tunnel was constructed in 1826-29 under Liverpool. Other tunnels of general interest are those under the Thames, the Sutor Tunnel, the Chicago Tunnel, the Nerthe Tunnel in France, and the Woodhead in England. Massachusetts has good reasons for being interested in the St. Gothard Tunnel and in some of the liberal measures adopted for its management.—*Boston Advertiser*.

An English Mogul Locomotive.

Under the title of "Details of Goods Locomotive, Great Eastern Railway; Mr. Massey Bromley, Locomotive Superintendent," *Engineering* of Jan. 23 publishes the following description and engravings:

The goods locomotives of the American "Mogul" type, of which we this week give a full-page engraving, have been placed on the Great Eastern Railway by Mr. Massey Bromley, the present Locomotive Superintendent; but their design is really due to Mr. Bromley's immediate predecessor, Mr. William Adams, who intended them to work main-line coal traffic, the *sine qua non* being that the paying load should reach the exceptionally high figure of 400 tons. The importance of being able to convey so heavy a load by a single train is best shown by the fact that at the moderate rate of $\frac{1}{2}$ d. per ton per mile, the earnings on the trip up loaded and down empty, would still reach the respectable amount of 5s. 2½d. per train mile, while the charge for conveying coal 180 miles would be but 4s. 8½d. per ton, a sum very considerably less than the difference that now exists between the prices of coal in, say, Leeds and London, or Norwich. The price of coal, important to every household, is a point in which the engineers and manufacturers of London and the Eastern Counties are specially placed at a disadvantage, and therefore these engines have not only a purely engineering interest as being of novel design and size, but are interesting to users of coal at large as being the instrument of effecting a great commercial economy.

While these engines were in process of construction, some doubts were expressed as to the possibility of a net load of 400 tons or 700 tons gross being conveyed at the speed which the exigencies of English traffic require. To test the question, a train weighing rather more than the exact weight was worked daily for some considerable time by a four-wheeled coupled engine originally designed by Mr. Adams to work fast goods and heavy passenger traffic. This engine had 6 ft. 1 in. driving wheels, 18 in. by 26 in. cylinders, a boiler barrel 11 ft. 5 in. long and 4 ft. 3 in. in diameter, and possessed a tractive force equal to that of the ordinary English goods engine with 17 in. by 24 in. cylinders and 5 ft. wheels. The experiment was perfectly satisfactory, the load was drawn at a good speed, about 19 miles an hour, including stoppages, and with a consumption of coal of but 56 lbs. to 60 lbs. per mile, and it was evident that under somewhat favorable conditions the work achieved by careful management of a four-coupled engine on trial could be carried out in daily practice by the engines designed specially for this work, possessing as they did 45 per cent more adhesion, 40 per cent greater cylinder power, and nearly 200 ft. additional heating surface. This expectation has been perfectly fulfilled, the engines we illustrate conveying their load with ease and being more than equal to the work, while their average consumption of fuel is lower than that of the trial engine, it being 52.5 lbs. of coal per train mile, and 47.1 lbs. per engine mile, results which, considering the load, are exceedingly favorable. Forty loaded 10-ton trucks are conveyed on the up journey from March to Temple Mills sidings (near Stratford), and sixty empties on the return journey. The worst gradient against the traffic is 1 in 135 for three-quarters of a mile, preceded by a long bank of 1 in 176. The worst gradient against the empty trucks is 1 in 100.

As will be seen from our engravings, these engines have outside cylinders 19 in. in diameter and 26 in. stroke, while the six coupled wheels are 4 ft. 10 in. in diameter. The tractive force which they are capable of exerting is $19^2 \times 26 = 161.8$ lbs. for each pound of effective pressure per square inch on the pistons. The overhang of the cylinders is prevented by a "pony truck," or species of two-wheeled bogie, which at once relieves the leading coupled wheels of excessive weight and guides the engine round curves. The springs of the driving and trailing wheels are coupled by means of an equalizing lever, while the weight of the front part of the engine is distributed between the leading coupled wheels and the pony truck, by means of an equalizing lever having an adjustable fulcrum on a heavy casting between the cylinders. The engine is thus virtually carried on three points, so that like a three-legged stool it must bear pretty equally on all points of contact, however uneven it—as represented by rough joints and crossings—may be. To further enhance the good effect of this system of levers, the springs of the coupled wheels are not less than 4 ft. 6 in. long, and composed of $\frac{1}{2}$ -in. plates, 5 in. wide, so that they are very elastic. The springs are all "underhung," that is to say, the spring-hangers are in tension, and pull down upon the springs. This entails somewhat clumsy brackets to the frame, but it effectually prevents springs shifting in the buckles, a matter of frequent occurrence when one hanger is in tension and the other in compression.

The pony truck, which has wheels 2 ft. 10 in. in diameter, is similar in design to that used on the Pennsylvania Railroad, and though it is somewhat difficult to comprehend its action from a drawing its construction cannot be termed complicated, while not only all its movements due to curves and inequalities in the rails have been suitably permitted and controlled, but possible derailment has been provided against by checks and chains which prevent the truck getting away from or thwarting the engine. From the longitudinal section of the engine, it will be seen that the main equalizing lever under the leading end is a trussed beam sustaining a load of about 12 tons on the centre. The top or compression member is a plain wrought-iron bar bearing against solid T heads formed on the lower or tension member. The strut is represented by a block of cast iron, on which bear case-hardened segments secured by transverse bolts. The relative amount of weight on pony and leading driving-wheels can be easily varied by removing the bolts and shifting the segments backward or forward, thus altering the position of the fulcrum on which the beam works. The top fulcrum block bears against, but is not attached to a heavy box casting, which braces the cylinders and frames together, the exhaust pipes being cast solid with it, and greatly contributing to its strength. The hinder end of the

main equalizing beam bears on a transverse beam taking the leading spring-hangers of two springs placed above the axle-boxes of the forward driving-wheels. The trailing hangers of these springs are, as will be seen from the drawing, attached to the main frame of the engine. The front end of the main beam bears through case-hardened rubbing pieces on an eye-bolt, the nut of which by means of a spherical washer, throws the weight on to a hollow cylindrical cast-iron plunger, working in a heavy cast-iron guide rigidly attached to the main frames of the engine. These details are clearly shown by fig. 3. The adjusting screw is used, not for altering the distribution of weight, but to level the main equalizing beam after shifting the fulcrum. The plunger being guided vertically bears on an india-rubber pad which lies in a cast-iron cradle, to which are firmly bolted two transverse plate springs, the T-headed links of which bear on a wrought-iron frame which rigidly connects the two axle-boxes together.

The pony truck radiates from a pin fixed to two horizontal plate stays between the main frames in front of the leading driving axle, as shown in general views on our full-page engraving. The radius bars are secured to the pony truck axle-boxes by vertical bolts, and are bushed with steel and supported by an india-rubber pad where they take hold of the pin from which they radiate, the object of the pad being to allow of the vertical tilting of the radius bars from the action of the springs. The side play is controlled by the T-headed links, which tend to keep the pony truck straight. But their effect is not so direct as that of the side springs in Mr. Adams' four-wheeled bogies, for should one of the two pins in the T-headed links be free when the engine is on the straight, the whole weight comes on the other pin, and the T-link becomes virtually inclined instead of vertical, and has, therefore, a constant bias to press the pony truck to one side. The effects of this action have been noticed in one or two of these engines, and show that the "pony truck" of our American cousins is not yet so perfect a machine as the "Adams bogie" so largely used in this country and the colonies. In America opinion is much divided as to the relative merits of different inclinations of links for swing bolsters, of short links and long links, but we think it self-evident that side springs, the only possible effect of which is to keep the bogie straight, must be preferable to links, which certainly cant the engine on a curve, and occasionally tend to make it run crooked when on the straight.

The valve chests are placed above the cylinders, and, of course, are therefore outside the frames. The slide valves are plain and unbalanced, but are circular in form and are worked by means of a rocking shaft which, however, does not reverse the motion, but simply transfers it from the eccentrics and expansion links (which are as usual inside the frames), to the valve spindle, which is in these engines outside the frame and above the slide bar, and is prolonged to a bearing in the motion plate. The rocking shafts are forged in the solid from the best Yorkshire scrap and work in a cast-iron bearing, the main part of which is solid with the leading driving-wheel splasher; a stiff cast-iron angle bracket binds the bearing to cylinders and frame.

Single slide bars are used, the brackets being entirely above and clear of the coupling rods. The cross-heads are of wrought-iron, machined out of the solid, the lower rubbing-pieces being simply a cast-iron gib-ended liner $\frac{1}{4}$ -in. thick held down by four cross-headed $\frac{1}{2}$ -in. bolts. The top rubbing-piece is also of cast-iron, secured to the cheeks of the wrought-iron crosshead by transverse bolts, the whole arrangement occupying but a small width, and enabling the coupling-rods to work between the crosshead and leading driving-wheel.

The bearing surfaces, as in all Mr. Adams' engines, are very large, the slide-blocks being 24 in. by 5 in., the axle journals 11 in. long by 8 in. in diameter—the largest, we believe, ever used in this country—the crank-pins are 5 in. by 5 in., and the motion-pins are 2 in. in diameter, a size which effectually prevents slobber, and enables the engines to keep their lead. The eccentric straps are of cast-iron, a material which, properly got up and made a slack fit top and bottom, and with all corners carefully rounded off to a large radius, will, with proper oiling, run almost without wear. The oiling once neglected, however, seizing is inevitable, and something must break. Brass wears, whether oiled or not, and if neglected simply gets warm and wears faster. White metal is easily fitted and generally wears well, but is expensive and is liable to be cut by dust and melted by neglect. Given a careful driver, cast-iron is, therefore, far the preferable material.

The axle-boxes are of solid brass, with cast-iron keeps, the crown being cored out to let the box wear faster vertically than sideways, and thus prevent "knocking," an unlikely thing, however, in bearings 11 in. by 8 in., or, say, 88 square inches, an area which may be compared with 6½ in. by 7½ in., or 51.5 square inches, the size of journals used on the Southern Railway of Austria, for engines having cylinders of the same diameter, and a greater weight on each individual axle. A description of the Austrian engines here referred to appeared on page 203 of our last volume.

The blower is of the usual Great Eastern Railway pattern, having an extra box and steam way, which can readily be coupled to suitable pipes in a running shed, and used to urge the fire in a neighboring engine, and get up steam quickly, often a point of great practical moment.

The regulator valve is situated in the smoke-box, and is a plain slide, worked by an arm on the regulator-rod, and though a small auxiliary valve is not used, no difficulty is found in working the regulator. Steam is taken from the dome by means of a cast-iron pipe, slotted at the sides, but closed at the top to prevent nuts, red-lead, etc., being dropped in when making the joint. The regulator handle, though high, is double, and can, therefore, be equally well managed by drivers of different statures. The reversing-screw is of steel, working in a brass bush, and is self-locking, on a principle long used on the Great Eastern Railway. The whistle is self-closed by the pressure of steam, aided by a slight auxiliary spring keeping a small mitre-valve on its seat.

A steam brake is applied to both engine and tender in a novel and effective manner, one brake-cylinder putting the blocks on all the wheels except those of the pony truck. This brake is found useful, not only for stoppages for signals, but in shunting and in controlling the speed of 700-ton trains down inclines of 1 in 100. * * *

The piston-rod of the brake-cylinder, made purposely large to resist vertical strains tending to bend it, pushes against a swinging lever, the lower end of which is coupled to the tender-brake gear; the other fulcrum is coupled to the engine brake-gear, and the proportions, 2 to 1, give 50 per cent. more power on engine than on tender, so as to accord with their average weights. The main engine pull rod is then coupled to an equalizing lever, the top or short arm of which is coupled to the trailing brake block, combined lever and hanger, while the lower or longer end is coupled to a lever, which forces the driving and leading brake blocks on the wheels, the proportions being such that each wheel has nearly the same brake block pressure applied to it. The arrangement is shown by our full-page engraving. The points believed to be essential to the successful working of a steam brake with cast-iron brake blocks, have been carefully attended to by Mr. D. H. O'Neale Neale, who, under

Mr. Adams' directions, got out the designs for this brake. A supply of dry steam is taken from the dome, and the holes in the steam-cock are small, namely, about $\frac{1}{8}$ in. in diameter, to prevent too sudden an application or release of the brake, and consequent fracture of wagon couplings. A self-acting cock to let out condensed water on steam side of brake piston was thought unsafe and unnecessary, and a drainage hole on far side is sufficient. The blocks grip the flange of the wheels but do not project more than $\frac{1}{4}$ in. inside the flange; the fin formed as the blocks wear can then break off without continually rubbing against the tire. The brake work is equalized throughout. The take-up screws allow of block and tire being worn out, and are not secured by lock nuts which often shake loose, but by a French hinged pin which answers well. The piston rings require to be a very good job. The boiler pressure is 140 lbs. to the square inch and the maximum pressure in brake cylinder is about 100 lbs. per square inch. The strength of spring in steam valve is about 40 lbs., but requires in the first instance careful adjustment by experiment.

As will be seen from the views on our full-page engraving, which is fully dimensioned, the boiler of the engines we are describing is of unusual size, the barrel being 11 ft. 5 in. long, 4 ft. 6½ in. in diameter outside, and made of $\frac{3}{8}$ -in. plates. The fire-box casing is 6 ft. long outside. The fire-box has the crown stayed directly to the top of the fire-box casing, the two rows of stays next the tube-plate being so made that the upward expansion of the inside fire-box—which occurs in excess of that of the outer shell when getting up steam—can take place without putting a crushing strain on the tube-plate. The barrel contains 240 tubes, $\frac{1}{2}$ in. in diameter outside, and 11 ft. 9¼ in. long between tube-plates, these tubes being arranged with $\frac{1}{2}$ in. water spaces. The chimney is 1 ft. 4 in. in diameter inside at the bottom, and 1 ft. 6¼ in. at the top, while the blast nozzle is 4¼ in. in diameter. The principal proportions of the boiler are as follows:

	Sq. ft.
Heating surface: Fire-box.....	102
Tubes.....	1291
Total.....	1393
Fire-grate area.....	17.8
Flue area through tubes, disregarding ferrules.....	3.17
Least sectional area of chimney.....	1.4
Ratio of fire grate area to total heating surface.....	1:72.6
Ratio of flue area through tubes to fire grate area.....	1:5.61
Ratio of sectional area of chimney to fire grate area.....	1:12.7

The engines are provided with six-wheeled tenders, of neat design, having tanks containing 2,600 gallons of water. A special feature in the tenders is the arrangement of the brake gear, which we have already mentioned as being operated by the steam-brake cylinder on the engine.

The following are the weights of the engine and tender:

	Full.	Empty.
	tons, cwt.	tons, cwt.
Engine:		
Pony truck.....	8 10 7 15	
Leading driver.....	12 11 10 17	
Driving.....	13 0 12 2	
Trailing.....	12 11 11 12	
Total.....	46 12 42 6	
Total adhesive.....	38 2	
Tender:		
Leading.....	8 1 5 2	
Middle.....	9 15 5 12	
Trailing.....	10 5 5 13	
Total.....	28 1 16 6	

NOTE.—The tender is weighed with a tank full of water, but with no coal. With the usual quantity of the latter, the distribution of weight would be more equal. The engine is weighed with 4 inches of hot water in the glass, fire and sand-boxes full.

The engines we have been describing, fifteen in number, were built by Messrs. Neilson, of Glasgow, and are fine specimens of the good workmanship and neat finish turned out by these makers, the boiler work being, as usual, pre-eminently good.

These engines, with their novel arrangement of wheels, great cylinder power, large heating and bearing surfaces, and powerful brake, certainly mark a new departure in English locomotive practice which seems full of promise, both to the general public in reduction of rates, and to the railway company in economy of fuel and lessened repairs to both engines and permanent way. Hitherto, no large railway company in this country has used six-coupled engines with outside cylinders for main-line traffic, the overhang at the front end rendering the engine unsteady, and throwing an excessive weight on the leading wheels. Mr. Adams a few years ago introduced large outside cylinder, four-coupled bogie engines for fast goods and through coal traffic. This innovation on ordinary practice was most successful, the engines burning only from 32 lbs. to 38 lbs. per mile, and running 50,000 to 60,000 miles before requiring repairs, and we have no doubt that Mr. Bromley, who succeeded Mr. Adams as locomotive superintendent of the Great Eastern Railway when the designs of the present engines were nearly completed, will find the latter equally capable of performing their work with great economy.

President Cole's Administration of the Nashville, Chattanooga & St. Louis Railway.

At the close of his report to the stockholders, at the annual meeting held in Nashville, Feb. 26, the President, Col. E. W. Cole, reviewed his eleven years' administration as follows:

As this is the last communication which I expect to have the honor of making to you, I may be permitted, in a brief manner, to review my labors and their results, achieved in connection with my directors, and the able and faithful officers by whom I have been surrounded. In September, 1870, we assumed control of the affairs of your corporation, and all know the discouraging circumstances surrounding your property and company at that time.

The condition of the road and its rolling stock was necessarily very bad, as there had not been time enough to restore it to its normal condition after the almost total destruction caused by the war. With a large and accumulating indebtedness, the credit of the company was at its lowest ebb and its stock selling at twenty cents on the dollar. With such a prospect before me, and being satisfactorily situated at the time in Georgia in connection with railroad management there, it was with great reluctance that I consented to the use of my name by my friends, who were large stockholders in the Nashville & Chattanooga Railroad Company. But we were appointed to its management by the stockholders, and, nothing daunted by the gloomy surroundings, we pushed forward, shoulder to shoulder, to work out its destiny, and, although, during the years that have passed, we were compelled to pass through many gloomy hours with seeming forebodings of disaster, we at length reached, successfully, the goal we had set before us.

In 1871 we settled satisfactorily the claim of the United States against the company of \$2,000,000 by means of a compromise, the authority for which was secured by a resolution through Congress, by paying \$1,000,000 in the company's 4 per cent. bonds with ten and twenty years to run,

This being accomplished, it gave some additional influence and credit to the company.

Soon after this it was believed to be the best interest of your company to purchase the Nashville & Northwestern Railroad, which was done, the anticipated benefits from which were never so near being realized as at present, which may be seen from its earnings. The money, about \$2,250,000, to purchase the bonds with which the state was paid for this road and its improvements, was borrowed from bankers in New York, and fell due during the panic in the fall of 1873. It is well known what consternation filled the minds of all during that period; and it did then seem, with such an amount of money already due, with almost no market price at that time for the bonds that the company had placed on its railroads to meet this liability, that the company was again nearly stranded. But by quiet determination we succeeded in convincing the bankers in New York that a reasonable settlement with us would not injure them, but save the company.

This, notwithstanding the excitement of the panic, they agreed to, and made easier terms with the company than could have been hoped for under the circumstances.

Seeing its way clear to do so, the company capitalized its stock, giving each stockholder three shares for one, which has gone above par, an advance of more than 1,500 per cent., counting the original stock at twenty cents, its price when the management took charge of the road.

The rolling stock and roadway of your company is in good order; the line between Nashville and Chattanooga has been laid in steel, except a few miles, the rails for which are now being distributed and all charged to monthly expenses.

On April 1, 1874, the company commenced to pay regular semi-annual dividends, and has continued to do so ever since.

I have already intimated my intention to retire from the Presidency of your company, in the service of which I have spent the greater part of my manhood, not doubting but that this meeting will satisfactorily arrange for the disposition of property acquired and contracts heretofore made in good faith, and for the settlement of liabilities honestly created in the judgment of the stockholders and directors in furthering the interests of your company. As a private citizen, yet one greatly interested in good faith being observed by all, I shall carefully observe future railroad management in connection with our local interests, and while there may, and doubtless will be, isolated complaints, as in the past, I trust no harm will come to our city or state in the change in ownership of the stock. But I cannot consent to retain a position with a company which may not be able to afford me the unquestioned authority to protect, in my judgment, its interests and that of its patrons; and further, because I cannot consent to deceive the Louisville & Nashville Railroad Company by professions of future cooperation, when I see that its interests and my duty as President of the Nashville, Chattanooga & St. Louis Railway might at times conflict; and in justice to myself I may be allowed to say, to all concerned, that I could not consent to be the executive of policies which would possibly subordinate myself and this road to an antagonistic and rival interest in which I might have no voice or discretion.

I do not wish those who are to control the fortunes of your corporation to understand for a moment that I have, by anything said, intended to convey the idea that they will not in the most perfect good faith carry out all their professions of friendship and justice to all localities through which their lines, as acquired, run. They are made by gentlemen of the highest character, and, until proven false, we must accept them as true, and if carried out, as I may not doubt they will be, I shall myself, as will every citizen of the state, award them full praise and commendation.

The through line that I had formed, and in which I had confidence, was suddenly sundered, and my aim at a trunk line under one management, from St. Louis to the South Atlantic, concentrated at one port, to secure a trans-Atlantic line for imports and exports, has been defeated. How far a divided effort to accommodate more than one of the South Atlantic ports will be successful, I will not undertake to say. But I shall be gratified at the success of any plan that has for its object enlarging the commercial importance of the South. I am not one of those who believe that large influence in the hands of an individual or corporation is necessarily a curse, but, on the contrary, it may be the means of many blessings to all, if that influence or power is conservatively, justly and wisely used.

Respectfully submitted. E. W. COLE, President.

Joint Executive Committee—February Meeting.

The following is the official report of the meeting held on Thursday and Friday of last week:

CHICAGO, Feb. 26, 1880.

Pursuant to the call of the Chairman, the Joint Executive Committee convened at 11 a. m. this day at the Grand Pacific Hotel, the following roads being represented:

Atlantic & Great Western, by J. H. Devereux, G. G. Cochran.

Baltimore & Ohio, by M. H. Smith.

Boston & Albany, by H. J. Hayden.

Cairo & Vincennes, by Roswell Miller, N. S. Pennington.

Canada Southern, by W. P. Taylor, W. H. Perry.

Chicago & Alton, by J. C. McMullin, Jas. Smith.

Chicago, Burlington & Quincy, by C. W. Smith, E. P. Ripley.

Cincinnati, Hamilton & Dayton, by A. H. McLeod.

Cleveland, Columbus, Cincinnati & Indianapolis, by E. B. Thomas, Lucien Hills.

Detroit, Lansing & Northern, by J. B. Mulliken, W. O. Carpenter.

Evansville & Terre Haute, by J. E. Martin, E. S. Babcock.

Fitchburg, by F. L. Parker, C. L. Hartwell.

Grand Trunk, by Jas. Moore, F. Howe.

Great Western, by F. Broughton, G. B. Spriggs.

Illinois Midland, by L. Genis.

Indiana, Bloomington & Western, by H. C. Diehl.

Indianapolis & St. Louis, by J. H. Devereux.

Lake Shore & Michigan Southern, by John Newell, Geo. H. Vaillant, J. T. R. McKay.

Lake Erie & Western, by E. H. Waldron.

Louisville, Cincinnati & Lexington, by J. B. Wilder, Edgar Hill.

Louisville & Nashville, by E. B. Stahlman.

Marietta & Cincinnati, by Wm. Duncan.

Michigan Central, by H. B. Ledyard, James Grier, A. W. Mackay.

New York Central & Hudson River, by J. H. Rutter, E. Clark, Jr., John B. Dutcher.

New York, Lake Erie & Western, by G. R. Blanchard, R. C. Vilas.

Ohio & Mississippi, by Wm. Duncan.

Pennsylvania Railroad, by J. McC. Creighton, D. S. Gray.

Pennsylvania Company, by J. N. McCullough, Wm. Stewart, D. S. Gray.

Pittsburgh, Cincinnati & St. Louis, by F. H. Kingsbury.

Toledo, Peoria & Warsaw, by W. S. Speirs.

Vandalia Line, by J. E. Simpson, H. W. Hibbard.
Wabash, St. Louis & Pacific, by John C. Gault, A. C. Bird.
ALBERT FINK, Chairman.

C. H. CROSBY, Secretary.

The Chairman announced that pursuant to the resolution of the last meeting authorizing him to employ additional assistance, he has secured the services of Mr. C. H. Crosby who would act as Secretary of the meetings of the Executive Committee.

The Chairman stated that the matters to be acted upon at the present meeting were as follows:

1. Revision of classification. The printed report of the Classification to Committee had been forwarded to each member of the Committee for examination prior to meeting.

2. Revision of rates on live hogs. (The Committee appointed as last meeting report by a vote of five in favor, and three against making the rate on live hogs the same as fourth class.)

3. Lumber tariff during the summer months, commencing April 1, 1880.

4. Rates on whisky. Referred at last meeting to Classification Committee.

5. Adoption of percentages on east-bound traffic from Ashland, Beardstown, etc. Committee appointed at last meeting will report upon this subject.

6. Adoption of a plan of making rates on foreign freight the same *via* all eastern ports between same points of shipment and destination.

7. Investigation of charges of cutting rates.

8. Revision of organization and By-laws of the Joint Executive Committee.

Any other subjects relating to the business of the Joint Executive Committee that may be brought before the meeting.

No objection being made to proceeding with the matters for consideration in the order named, the meeting proceeded to their consideration.

REPORT OF COMMITTEE ON CLASSIFICATION.

The Revised Classification was submitted by the committee, accompanied by the following letter from its chairman:

"CLEVELAND, O., Feb. 16, 1880.

"ALBERT FINK, Esq., Chairman, New York City:

"MY DEAR SIR: The Committee on Classification met pursuant to adjournment at Cleveland, Feb. 10, for the purpose of arranging the classification in such a way as to obviate, so far as possible, the present cumbersome and unsatisfactory form; the use of certain figures over and under a certain class having been found to be very troublesome in preparing tariffs for all points except Chicago. There was also another object in view; that being that, as at present, there are a large number of articles governed by the fluctuating fourth-class rate which might just as well be charged a fixed rate, and not be changeable when tariffs are changed.

"The basis presented to the meeting was to establish six fixed rates, three fluctuating, and the lumber rate; this was afterward changed to four fluctuating, on account of the fact that there was no provision made for bulk meats, now classified at five cents above fourth-class.

"This, therefore, gives eleven classes, and the basis from Chicago as follows, viz:

1st	2d	3d	4th	5th	6th	7th	8th	9th	10th	11th
1.20	90	70	60	50	45	45	40	30	33	50
Fixed.						Fluctuating.				

all being per 100 lbs. except class 9, which represents flour, car-loads of 125 bbls. per car, and calling, according to custom, 200 lbs. to the barrel.

"We have given the classification a careful and thorough revision on this basis, and the result is that a very large number of articles hitherto carried in the fluctuating fourth-class rate are placed in the fixed sixth-class rate, so that a largely increased revenue will be derived therefrom.

"In all our proceedings in this we have endeavored to be fair, just and liberal, and yet obtain for the railroad interests a fair return for the work performed, and while there will probably have to be some changes made in the future, so far as articles placed in sixth class are concerned, yet we have been so cautious in our action that we trust the changes will be very few.

"We have, by this classification, reduced the number of classes from sixteen to eleven, and, in the fourth, fifth and sixth classes, placed a large number of articles governed by the necessary fluctuation of the fourth-class rate.

"The meeting was harmonious in its action, and nothing passed upon without giving each member of the committee a chance to be heard.

"We have placed the classification before you, showing the proposed class of each article, and opposite the class as it is now, and would respectfully ask for your consideration and approval of the same. Very respectfully,

"J. T. R. MCKAY, Secretary of Committee."

It was stated that since the printed revised classification had been issued, some changes and additions had been made, which were read.

Moved by Mr. Gault, and seconded by Major Simpson, that the classification be adopted. Carried.

REVISION OF TARIFF TO NEW ENGLAND INTERIOR POINTS.

The committee presented the following report:

"Resolved, That, after a very thorough and patient investigation, your committee fails to agree upon any plan whereby the absorption of New England arbitraries can be discontinued, and, therefore, asks to be discharged from further consideration of the subject."

After reporting as chairman, Mr. Hayden asked permission to make a few personal remarks in explanation, in substance as follows:

"The first disagreement of the committee, the re-commitment of the matter to them for further consideration, and their final agreement to disagree, seem to make necessary some explanation of the difficulties they encountered in the consideration of the subject, and which make it impossible to attain the results aimed at.

"The desired results appear to be:

"1. Selection of such points as can pay an arbitrary in addition to the Boston rate.

"2. A partial division of territory, or concession of certain points to each line, to which such line shall alone quote rates.

"3. As a result of the first two, a discontinuance of the practice of absorbing arbitraries.

"First, there are but few points, to reach which the payment of an arbitrary by all lines is necessary; the practice for many years of applying the Boston rate to the terminal of main lines and of all side connections which would accept Boston divisions, and of their using the same rate and divisions to all intermediate points, having practically made all towns of any importance Boston-rate points by one or more lines on Boston divisions.

"Second, a division of territory, or concession of certain points to each line alone, is impracticable, because all lines do not enter New England under the same conditions as to the importance of towns which might be conceded to each, and there is a decided unwillingness on the part of all lines to surrender any important point, by whatever method it may have to be reached.

"Third, the disadvantages attending the absorption of arbitraries are evident to all, but if it is acknowledged that the lines can not, in justice to themselves, surrender points which can only be reached through absorption, such discontinuance is impracticable."

On motion, the report was adopted.

REVISION OF RATES ON LIVE HOGS.

The following report was presented:

"BOSTON, Feb. 13, 1880.

"To the Joint Executive Committee.

"GENTLEMEN: Your Committee met at the Brunswick Hotel, Boston, Feb. 12. Present, Messrs. Dutcher, representing Michigan Central, L. S. & M. S. R. R., and N. Y. C. & H. R. R. R.; Mills, the Vermont Central; Hayden, Boston & Albany; Gray, Penn. Co.; Griffiths, Penn. R. R. Co.; Vilas, N. Y., L. E. & W. R. R.

"The following resolutions, offered by Mr. Hayden, were carried by vote of 5 to 3, the Michigan Central, L. S. & M. S. R. R., N. Y. C. & H. R. R., Vermont Central, and Boston & Albany voting affirmatively, and the N. Y., L. E. & W., the Penn. Co., and the Penn. R. R. Co. voting negatively.

"Resolved, That in order to place the packers on the Eastern seaboard upon an equality with the Western packers, so far as competing in foreign markets is concerned, it would be necessary to make a rate upon live hogs not higher than the New York provision rate.

"Resolved, That in the opinion of your Committee it is advisable and in accordance with the interests of the railroad companies to make the rate upon live hogs to New York and New England the same as the New York fourth-class rate with customary differences to other points.

"L. MILLIS, Chairman.

"W. F. GRIFFITHS, Secretary."

The following resolutions were offered by Mr. Blanchard:

"Resolved, That, beginning March 1st, the rates on live hogs be five (5) cents per 100 lbs. in excess of the provision or new seventh-class rate.

"Resolved, That the rate to Boston and New England points be the same as to New York, and that no rebate shall be paid on hogs either for foreign or domestic use at or from any port or point."

The vote on this resolution was as follows—Ayes, 29; nays, 3.

The Chairman said he approved of the measure as a proper one, and would therefore make the vote unanimous, according to Article 11 of the organization.

CHANGE IN EAST-BOUND RATES.

Mr. Blanchard, seconded by Mr. McCullough, moved to take up the question of east-bound rates. Carried.

Mr. Rutter said he was not prepared to express at once any definite opinion on the question of a reduction of rates. Many grain-dealers had said to him that a reduction in the corn rate would move the product, while it was probable that a reduction in the wheat rate would not move that article at present. He hoped to hear fully from the Western members of the Committee on this subject.

Mr. Blanchard stated that representations were being made at Washington to influence action upon the transportation bills now before the House, which sought to show that the system of co-operative organization in making rates had given great power to the railroads to affect values and the commerce of the country, and he thought this Committee should avoid the appearance even of exercising such power arbitrarily and unreasonably. It was also alleged by these letters and statements that the through rates were disproportionately higher than those east of the trunk lines' western termini, and that the discriminations in this respect had been transferred from the East to the West. He thought that the power of charging fair and uniform rates by the co-operation which had replaced dissension should be wisely and equitably used for the public as well as railway good. It was represented to him that the railroads need not apprehend any very serious competition this year from the lake outlets, as it was claimed that the charters, being made for lumber, etc., would not leave much tonnage available for grain. It was further claimed by some parties that an open reduction of five cents per 100 lbs. would not stimulate business, but that a rebate of that amount would. In his opinion no notice should be taken of this suggestion, but any action taken should be open and above-board, and be based solely on what is right, and that the Committee should strive to fix stable rates of transportation; and he further thought it would have been desirable in October to have made the announcement that no change in rates would be made before March, and further, that it would be desirable to make but three changes of tariff per year. He had thrown out these remarks for the purpose of eliciting discussion, and to hear from the Western men more familiar with the facts.

Mr. Rutter thought the political aspect of the question deserving of serious consideration. He supposed the editorial article of the *Tribune* of yesterday, concerning the railroad situation, had been sent to every member of Congress, and every railroad official in the country.

Mr. M. H. Smith thought the article referred to would have but little effect, as the statements made therein that "previous to the closing of navigation last fall the railroad rate on grain and provisions was 15 cents per 100 lbs. between Chicago and New York (and other Western points relatively the same)," and that "when water competition was shut off at the beginning of winter, this rate was advanced by 'railroad federation' to 40 cents on grain and 45 cents on provisions, was untrue, and known to be so by every shipper throughout the country; that on June 9 rates were fixed on a basis of 20 cents on provisions and 15 cents on grain from Chicago to New York; on June 23 at 25 cents and 20 cents; on Aug. 4 at 30 cents and 25 cents; on Aug. 25 at 35 cents and 30 cents; on Oct. 13 at 40 cents and 35 cents, and on Nov. 10 at 45 cents and 40 cents, which basis has been adhered to since that date." He would favor a reduction of corn if it could be confined to corn, but would not favor a reduction on wheat; he thought the corn rate had been too high all winter, as the present cost of transportation on wheat was about 15 per cent. of its value, while on corn it was about 33 per cent.

Mr. Gault said he had no hesitation in saying that the general business public were satisfied with the present system of maintenance of rates, for they had had fairer and better treatment this winter than ever before, from the fact that they were all upon an equality as to rates. In regard to the immediate question, it was obvious that the 40 cent rate could not be held all summer, and that a reduction must be made, but he hoped the summer rate would not go below 30 cents, and he thought it would perhaps be well to consider the question whether a reduction of 5 cents should not be made now to last until April 1, and then make the rate from that time 30 cents, to last all summer, and notify the public to that effect.

Mr. Devereux said he had not intended to make any remarks on the rate question, but was induced to do so by Mr. Blanchard's remarks, which he thought deserving of serious consideration. He thought a great deal of weight should be attached to newspaper articles, and proper means taken to present the real facts to the public. He alluded to the great change which had taken place in the matter of rates and

their maintenance during the past year. He very heartily endorsed Mr. Gault's position as to rates and their maintenance, and said the railroads should labor to make the public feel and understand, what was very difficult for them to understand, that the combination of railroads for the maintenance of rates was for the benefit of the public and the state, and not for their hurt. This could not be done by mere promulgation of rates and resolutions for their maintenance, but by full explanations of the reasons influencing the action of the railroads, courting the greatest publicity, and affording every facility and aid for Congressional or other committees to investigate such matters. The public should be able to make their business arrangements based upon the fact that rates are going to remain unchanged for a fixed period. He then moved that the chair appoint a committee to consider the question of how long the present rate shall rule, and when it shall be changed, and generally consider the questions elicited by the discussion.

Seconded by Mr. McMullin. Carried.
The Chair appointed as such committee Messrs. Devereux, Creighton, Blanchard, Rutter, M. H. Smith, McCullough, Newell, Ledyard, Howe, Gault, McMullin.

CHANGE IN LUMBER RATES.

The question of what the lumber tariff should be during the summer months was taken up.

On motion, the matter was committed to the following committee, appointed by the Chair: Messrs. Mulliken, D., L. & N. R. R.; Moore, G. T. R.; Grier, M. C. R. R.; Perry, C. S. R.; Spriggs, G. W. R.; McKay, L. S. & M. S. R.; Wight, B. & O. R. R.; Leet, G. R. & I. R. R.; Edwards, F. & P. M. R.; Hills, C., C. & I. R. R.; Geiger, J., M. & I. R. R.; Hibbard, Vandallia R.

QUESTION OF WHISKY RATES.

Necessary action on this question had been taken by the Classification Committee.

On motion, recess was taken until 3 p. m.

REDUCTION OF RATES IN 8TH AND 9TH CLASSES.

On reassembling at 4 p. m., the Rate Committee presented the following report:

"1. Resolved, That a reduction be made in the classes 8 and 9 (as per classification adopted this date) of five (5) cents per 100 lbs.

"2. Resolved, The reduction of five (5) cents per 100 lbs., provided for by the preceding resolution, to be made to take effect on the articles of grain and flour on Monday, March 1, and on the other articles included in the eighth class to be made to take effect on Monday, March 8, 1880.

"3. Resolved, That the new classification as adopted this date go into effect Monday, March 8."

Moved by Mr. Vilas that the report be received and adopted. Carried.

The Chairman stated that he understood each company would take such steps as were necessary to make known the foregoing resolutions to all agents of the roads represented on the Committee, as the full report of the meeting could not be published before Saturday.

(Copies of the Revised Classification may be had on application, of J. T. R. McKay, Assistant General Freight Agent, Cleveland, O.)

The Chairman called attention to the resolution passed at the last New York meeting changing percentage for east-bound rates from Detroit, Toledo, Cleveland and Port Huron.

Mr. Vilas moved that the said percentages be adopted, to take effect March 1, 1880. Carried.

REPORT OF COMMITTEE ON PERCENTAGES FROM ASHLAND, BEARDSTOWN, ETC.

The Chairman called attention to the importance of this subject, as the failure to determine the percentages from the points named on business coming from the Missouri River might lead to disturbance of rates east of the Mississippi; while rates were not maintained from Missouri River points, some plan should be devised by which the rates east of the Mississippi should not be disturbed by any irregularities in rates west.

The following report from the committee to whom this subject had been referred was then presented:

"Resolved, That the percentages from Beardstown, Ashland, Bushnell and Chapin, shall be the same as from East St. Louis, and that the Southwestern Railroad Rate Association be requested to name their arbitrary rates up to such points, so as to make the same through rate from Missouri River points to the sea-board, as via Chicago or East St. Louis. The Secretary was instructed at once to forward a copy of these proceedings to the Secretary of the Southwestern Railroad Rate Association, in order that he might take such action as was necessary to enable the lines east of the Mississippi River to carry out the above resolution.

G. H. VAILLANT, Secretary."

A communication was read from J. W. Midgley, Commissioner of the Southwestern Railway Association, giving his reason for not approving the proposed action of the Committee.

Mr. Simpson moved that the report be recommended to the original Committee, with the addition of a representative from the Wabash and Chicago & Alton roads, to consider the original points involved, and also the points raised by Mr. Gray and others as to the revision of the published percentage table from certain Western points from which no rating arrangements exist, and to report to-morrow morning. Carried.

CHANGE OF CLASSIFICATION OF TOBACCO.

Mr. Stahlman submitted the following report from the Permanent Committee on Tobacco Rates:

"The Committee on Tobacco rates recommend that leaf tobacco in hogsheads be taken out of sixth-class rates and be made special, and that rates be made on the following basis to New York:

From St. Louis, Hannibal, Quincy and other	
Mississippi River points, all rail.....	52 cts. per 100 lbs.
" Cincinnati depot.....	39 " "
" Louisville, Jeffersonville and New Albany	
depots.....	43 " "
" Evansville depot.....	48 " "
" Cairo depot.....	54 " "
" Paducah, all rail.....	57 " "
" " rail and water.....	55 " "
" Owensboro, all rail.....	56 " "
" " rail and water.....	54 " "
" Henderson, all rail.....	56 " "
" " rail and water.....	54 " "
" all other Ohio River landings between	
" Louisville and Cairo.....	54 " "

And to the end that an understanding with the Chesapeake & Ohio Railway may be arrived at, the Chairman of the Joint Executive Committee be hereby requested to communicate with the managers of the Chesapeake & Ohio Railway, and ask a representative of that line to meet the rate Committee at Louisville on Wednesday, March 10, to arrange water differences and such other matters as may affect this traffic.

E. B. STAHLMAN, Chairman."

Which was, on motion, adopted, all roads voting for it, except the Cleveland, Columbus, Cincinnati & Indianapolis.

COMMITTEE APPOINTED TO INVESTIGATE CHARGES OF VIOLATING RATES.

Moved by Mr. Thomas that the Chairman appoint a com-

mittee to investigate any charges of violating rates that may be brought against any members of the committee. Carried.

In accordance with the foregoing resolution the following Committee was appointed, to report at 12 o'clock noon to-morrow:

Messrs. Devereux, Rutter, Blanchard, M. H. Smith, Creighton, Ledyard, McCullough, Newell, Howe, Spriggs, Gault, Hayden, Parker.

Mr. Gault appointed Mr. Bird to act as his representative on the Committee.

Adjourned to 12 o'clock noon to-morrow.

The committee reassembled at 1 o'clock p. m., and on motion adjourned until 2 o'clock p. m.

Committee called to order at 2 o'clock p. m.

REPORT OF COMMITTEE ON INVESTIGATION OF CHARGES OF VIOLATION OF AGREEMENTS.

The following report was presented:

"CHICAGO, Feb. 27, 1880.

"Committee appointed to receive and consider any charges of violating agreements on rates that might be presented against any member or members of the Joint Executive Committee, met at 10:30 a. m., Mr. Devereux in the chair.

"Present—Messrs. Smith, Gault, Bird, Rutter, Gray, Howe, Spriggs, Hayden, Parker, Creighton, Vilas, McCullough, Grier, Broughton, McIlhenny.

"The Chairman said charges to be preferred must be presented in writing.

"Mr. Rutter, after reviewing the previous action of the Committee, which had considered charges of violation of agreement by the Grand Trunk and Central Vermont railways, called upon Mr. McIlhenny to read the charges against those companies, which was done.

"After a discussion participated in by members of the Committee, and supplementary statements having been presented by Mr. Hayden and Mr. Parker in respect to the cutting of east and west-bound rates, via Boston, by the Grand Trunk Railway, and after an explanation by Mr. Broughton, confirmatory of the same matter; upon motion of Mr. Smith, seconded by Mr. McCullough, it was

"Resolved, That whereas at the meeting of the Joint Executive Committee held in New York on January 20, 21 and 22, 1880, the Committee which was appointed to investigate charges that might be presented regarding violations of agreed rates, reported as follows:

"No charges were made at this session except against the National Dispatch Line, and the officers of the Grand Trunk and Central Vermont Companies having given assurance that they will state to the full Committee that in future their companies, severally and jointly, agree to maintain rates and to govern and be responsible for the acts of all agents working over their lines, your Committee respectfully recommends that no further action be had at this meeting, and for the additional reason that the evidence, which is not now complete, will be submitted in full by the officers of those companies to the Commissioner in response to a resolution of your Committee to that effect. And

"Whereas, During the session of the Joint Executive Committee, on the 22d January, the representatives of the Grand Trunk Railway and the Vermont Central Railway did give the promised assurance that rates should thereafter be maintained, and that they would thereafter be responsible for the acts of all agents contracting property for transportation via their lines;

"Be it Resolved, That the charges this day made by the representatives of the New York Central & Hudson River Railroad Company and connections, that the Grand Trunk Railway connections have violated their agreements with the Joint Executive Committee by persistently transporting property for several months past between the seaboard and Western points for less than the agreed rate, and have continued to do so since the meeting of the Joint Executive Committee held at New York, Jan. 20, 21 and 22, where the representatives of the Grand Trunk and Vermont Central railways did give positive assurances that the rates thereafter should be absolutely maintained; are, in the opinion of this Committee, fully substantiated.

"Resolved, That this Committee recommend that the evidence and statements presented to this Committee, together with that presented to the last meeting of the Joint Executive Committee, be referred to the Chairman, with instructions to transmit the same to the Chairman of the Trunk Line Presidents.

J. H. DEVEREUX, Chairman."

After some general discussion had taken place, Mr. Howe, as the representative of the lines at this point, desired only to say in defense of the charges made against the National Dispatch Line and the Grand Trunk and Central Vermont railways, that he had made no deviation from the established rates from Chicago or other points, and requested Mr. Devereux to read the following telegram received from Mr. Seargeant:

Mr. Devereux read as follows: "MONTREAL, 26, 2, 1880.

"J. A. MOORE, Chicago.

"If there are any charges of cutting rates, I presume they can be met. Have not authorized, but on the contrary forbidden any such course. It is my belief, from the facts which have come to my knowledge, that this has been done by other routes, and if any evidence is forthcoming against this it had better be submitted and we will meet it now or hereafter, etc. (Signed) L. J. SEARGEANT."

It was then moved that the report be adopted, the following parties voting aye: Atlantic & Great Western; Baltimore & Ohio; Boston & Albany; Canada Southern; Chicago & Alton; Chicago, Burlington & Quincy; Cleveland, Columbus, Cincinnati & Indianapolis; Fitchburg; Indiana, Bloomington & Western; Indianapolis & St. Louis; Lake Shore & Michigan Southern; Lake Erie & Western; Louisville, Cincinnati & Lexington; Louisville & Nashville; Marietta & Cincinnati; Michigan Central; New York Central & Hudson River; Great Western; New York, Lake Erie & Western; Ohio & Mississippi; Pennsylvania Railroad; Pennsylvania Co.; Pittsburgh, Cincinnati & St. Louis.—23; the Grand Trunk voting no.—1.

The Chairman then declared the report adopted.

REVISION OF PERCENTAGES FROM ASHLAND, BEARDSTOWN, ETC.

The committee made a report which was amended and adopted, as follows:

"CHICAGO, Feb. 27, 1880.

"The committee appointed to make percentages from interior Illinois points on business coming from Missouri River points, would respectfully report as follows, viz:

"The Southwestern Railroad Association making their rates from Missouri River points to all Mississippi River points the same, this committee recommend that the rates from all Mississippi River points to the seaboard be made the same as from East St. Louis on business coming from Missouri River points, and that all percentages from points west of the Mississippi River be withdrawn, and that no rates be made from interior Illinois points to the sea-board on business coming from Missouri River points.

"In accordance with the foregoing, this Committee would recommend that rates from Hannibal, West Quincy, Burlington, Keokuk, Louisiana and Davenport, shall be the same as from St. Louis.

"Rates from East Hannibal, Quincy, East Burlington,

East Keokuk, Rock Island and East Louisiana, shall be 116 per cent. of the Chicago rate.

"This basis to take effect March 1, 1880."

REPORT OF COMMITTEE ON LUMBER RATES.

Committee made report, which was amended and adopted as follows:

"Resolved, That the tenth-class rate be made as follows:

April 1 to Oct. 1, 1880.	
Chicago to New York, 30 cents per 100 lbs.	
Chicago to Boston, 35 " "	
Nov. 1, 1880, to April 1, 1881.	
Chicago to New York, 35 cents per 100 lbs.	
Chicago to Boston, 40 " "	

"The rates from Toledo, Carlton and Port Huron to be based upon 75% per cent. of the rates from Chicago to New York, and that the rates from Buffalo and Tonawanda shall not be less than the all-rail proportion of all-rail rates."

Adjourned. ALBERT FINK, Chairman.

C. H. CROSBY, Secretary.

THE SCRAP HEAP.

The St. Charles Bridge Verdict.

The following is the verdict of the Coroner's jury in the St. Charles bridge case:

"We, the jury, having been duly sworn and affirmed by James R. Mudd, Coroner of St. Charles County, Mo., diligently to inquire and true presentment make, in what manner and by whom Jordan W. Hyde, Josiah Wearin and Joseph Barnhart, whose dead bodies were found at the railroad bridge in the Missouri River at St. Charles, Mo., on the 8th day of November, 1879, and Jordan Somers and Charles Irwin, who were taken from the wreck and died afterward, came to their death.

"After having viewed the bodies and heard the evidence, and made all the inquiry in our power, as is shown by the voluminous testimony adduced from men who miraculously escaped death of the ill-fated train; from practical men employed by the Wabash, St. Louis & Pacific Railway Company, and also from eminent civil engineers, experts in railway bridge-building, from all parts of the country, do find that the first named parties, Joseph Wearin, Jordan W. Hyde and Joseph Barnhart, came to their death almost instantaneously; that John Somers and Charles Irwin died from injuries received at the same time.

"That the cause of their death was the falling of the western through span of the St. Charles railway bridge, which was precipitated from over a height of 80 ft. to the bottom of the Missouri River, carrying with it the caboose in which they were.

"The cause of the disaster is, in our judgment, attributable to a combination of circumstances, not altogether accidental and within the control of man.

"We conclude, therefore, that the falling of the western through span was caused by a derailed car or cars, which were thrown from the track just before entering upon the fallen span by a brake-rod or beam, and destroyed the span, either by breaking through the floor and striking the lower lateral bracing, drawing the bottom chords inward and off the pillars that supported them, or the violent shock of the derailed cars may have broken an upper chord of the span thus destroyed.

"The railway company or owners of the bridge are responsible for the fatal result of the disaster in allowing the floor timbers to remain in the bridge so long that they became deteriorated, and for not subjecting the cars to a rigid inspection before their entering upon the bridge.

"We further consider that the floor system of the bridge in use at the time of the accident, while in accordance with approved practice at the time of its construction, was not altogether safe, and it lacked the necessary precautions against disaster resulting from derailed cars."

Testing Strength of Screw-Threads.

Mr. John L. Gill, Jr., of the Pittsburgh Car-Wheel Works, is preparing the apparatus for a test of the strength of different screw-threads now in use. The tests will have the special object of determining the relative strength of the V thread with sharp edge, the United States standard thread, and the V thread, one-fourth off, respectively. The testing machine is of the ordinary character, and is provided with a micrometer and electrical attachments, so as to insure accuracy in the result.—American Manufacturer, Feb. 26.

Proposals for Car-Seals.

Sealed proposals will be received until noon of March 24 for furnishing the Treasury Department fastenings for cars transporting dutiable goods in bond and goods passing in transit through Canada and seals for packages, in such quantities as the Department may from time to time require.

Proposals will be accompanied by samples of the articles proposed to be furnished, and will state the price at which the same, boxed and marked for shipment in such manner as may be required by the Department, will be delivered at the office of an express or freight company at the place of manufacture. Where lead seals and wires, glass seals or other seals of like character are submitted, at least one dozen of each should be furnished.

The Department reserves the right to reject any or all bids, and to waive informalities.

Due examination will be made of and full consideration given to the merits of all locks, seals and other devices which may be submitted.

Printed forms of proposals are not furnished, nor are they necessary.

Proposals may be made for furnishing either or both of the articles named, to be marked "Proposals for Car-Fasteners" or "Proposals for Package Seals," as the case may be, and addressed to the Secretary of the Treasury.

Two Lost Cars.

A curious accident occurred on the Pennsylvania Railroad, between Mineral Point and East Conemaugh, one day last week. A west-bound freight train broke in two, half the cars being left behind, and the break was not noticed until the front section had gone ahead about two miles. The rear portion followed on at a slower rate until it reached Conemaugh Bridge No. 6, when the first two cars plunged into the river forty feet below and left the others, which kept on in the even tenor of their way, regaining the front section a short distance ahead. It puzzled the train men to account for the fact that only two of the cars went over without the rest, for the track on the bridge was found to be without the slightest displacement.—Pittsburgh Telegraph, Feb. 21.

Automatic Brakes.

The English Mechanic says: "At the meeting of the Institution of Mechanical Engineers last week, Mr. T. H. Riches read a paper entitled 'Is automatic action necessary or desirable in a continuous brake?' Mr. Riches concludes that there is not in existence any automatic brake sufficiently trustworthy to justify its use in preference to the best description of non-automatic brake. Mr. J. Robinson subsequently explained that Mr. Riches had been asked to write a paper, so that a discussion might be held on the merits of the vacuum brake, and to avoid the appearance of an undue preference having been given to the automatic brake—a rather curious explanation all round."



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EDITORIAL ANNOUNCEMENTS.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Addresses.—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

THE PENNSYLVANIA REPORT.

So extensive is the property worked and controlled by the Pennsylvania Railroad, that the President's report, one of the longest documents of the kind published, still gives scarcely any details as to the operations of the year except the gross and net earnings and working expenses of each line worked directly, the traffic and the average rates received, and the disposition of the net earnings, together with the discussion absolutely required to show the leading events in the company's history for the year, and its plans and prospects for the next year. There is not even the usual statement of earnings from different sources and expenses under the leading heads, but simply the total of gross earnings and of working expenses. It must not be understood, however, that this is all the information that the company publishes: it is the President's report only, which is advertised in the Philadelphia newspapers a week before the annual meeting. The company publishes a quite full and in many respects excellent report in a pamphlet, but it usually appears two months or more later, and consequently receives much less attention than it deserves; most people who have read one report, or review of a report, considering themselves absolved from further attention to that company's report for that year. But the Pennsylvania report includes the reports of a considerable number of railroad companies, and no ingenuity would suffice to present its affairs in any detail within a moderate compass. If it is to be studied at all, it must per force be taken in installments.

It is hard to form a realizing sense of the extent of this company's operations. Perhaps we come nearest to it by considering the gross traffic and earnings of those roads whose management it absolutely dictates, namely, those worked by the Pennsylvania Railroad Company, by the Pennsylvania Company, and by

the Pittsburgh, Cincinnati & St. Louis Railway Company, which have been as follows, the traffic for five years, and the earnings and expenses for six years.

All Lines East and West of Pittsburgh.

Year.	Gross earnings.	Working expenses.	Net earnings.
1874.....	\$62,514,498	\$3,335,797.65	\$59,178,700
1875.....	82,502,679	3,594,862.58	78,907,816
1876.....	83,067,171	3,646,222.81	79,420,948
1877.....	84,070,600	3,435,977.80	80,634,622
1878.....	88,776,086	3,384,194.43	85,391,891

Now this passenger traffic is more than half as great, and this freight traffic is nearly as great, as that reported for all the railroads reporting to the New York State Engineer and Surveyor the year ending Sept. 30, 1878, the last for which the report has been published; and the New York report contains returns not only from the great railroads in the state, but for four very important ones whose lines are mostly out of the state, namely, the Lake Shore & Michigan Southern, the Atlantic & Great Western, the Boston & Albany, and the New York, New Haven & Hartford. There is probably no other state than New York in the Union that has so large a traffic on all its railroads as there is on the lines administered by the Pennsylvania Railroad Company. Their gross earnings in 1879 were equal to about one-eighth, and their net earnings to more than one-eighth of the total gross and net earnings of all the railroads of the United States for the last year reported (their mileage being less than one-twelfth). It is, therefore, with reason that the results of its operation are looked upon as especially significant of the condition of railroads throughout the country in which its lines are situated—that is, from the Hudson on the east to the Mississippi on the west, and north of the Potomac and the Ohio.

Taking the system as a whole, we find that its passenger traffic in 1879 was the largest recorded, except in the Centennial year, and 8 per cent. greater than in 1878; its freight traffic much the largest ever known and 26 per cent. greater than in 1878; its gross earnings 8.8 per cent. greater than in 1878 and exceeded only in 1874 and the Centennial year; its expenses 6 per cent. more than in 1878 and the largest since 1876; and its net earnings 11½ per cent. more than the previous year, and the largest for the six years in the table. Certainly a notable improvement, made (since 1878) with comparatively little increase in mileage.

The increase in net earnings is the more satisfactory because the average freight rates received were less, and lower than ever before, and for some of the lines lower than we have ever seen reported before by any railroad in any country. This was to be expected, for the east-bound rates were frightfully low more than half of the year, and were restored later rather than earlier than in 1878, and not quite to the average of the fall rates of that year. The maintenance of rates since the close of navigation affected only the business of one month, December, when rates, though not maintained, were not largely reduced in 1878. This calendar year, so far as rates and traffic are concerned, compares very well with the fiscal year of the other three trunk lines, ending with September. There was good traffic the year round both years, and good rates in the fall and bad ones the rest of the year; only, the profitable season included in the reports of the three last-named roads was in the fall of 1878, and that of the Pennsylvania in 1879.

Taking the lines east of Pittsburgh and Erie for the comparison, we find that the four trunk lines show the following difference for the last year as compared with the previous year:

	N. Y. Cen.	Erie.	Penn.	B. & O.
Freight traffic Inc. 12.4 p.c.	Inc. 28.4 p.c.	Inc. 25.0 p.c.	Inc. 25.0 p.c.	Inc. 25.0 p.c.
Pass. traffic Inc. 3.1 "	Inc. 6.3 "	Inc. 7.4 "	Inc. 7.4 "	Inc. 7.4 "
Gross earnings Dec. 1.8 "	Inc. 1.0 "	Inc. 0.4 "	Inc. 0.4 "	Inc. 0.4 "
Expenses Dec. 0.1 "	Inc. 5.7 "	Inc. 10.4 "	Inc. 10.4 "	Inc. 10.4 "
Net earnings Dec. 4.0 "	Dec. 4.8 "	Inc. 8.1 "	Inc. 8.1 "	Inc. 8.1 "

In this comparison the Baltimore & Ohio main line and branches are taken. It does not report passenger and tonnage mileage, but its through freight (which alone increases rapidly) was 24 per cent. more than in the previous year. The great increase of freight traffic on the Erie was due chiefly to the gain in anthracite coal; its increase in other traffic was 11.6 per cent. The Pennsylvania profited more than all the other roads together, probably, by the great activity in iron manufacturing after August, and in expenses it suffered by having higher prices to pay in the last quarter of the year, though this did not have its full effect the whole quarter, doubtless, contracts being made ahead for many materials.

There are some reasons why the Pennsylvania Railroad Company should profit more than any other by the revival of business. As is known, it leases a very large number of other roads, and gains by their prosperity and loses by their adversity. This has been a leading cause of its financial difficulties since 1873. When a lease is made, the rental, if fixed, is likely to be based on the estimated average profits of

the property. Certainly the lessors would not let it go for what they supposed to be its minimum profits if they felt able to work it to advantage themselves. Now, a company working four or five thousand miles of road and owning but four or five hundred may have all its profits absorbed by comparatively slight average losses on its leased lines; and, on the other hand, it may have them enormously increased by comparatively small average profits on these lines.

Again, the Pennsylvania Railroad Company has invested more than \$65,000,000 in the securities of other corporations, chiefly railroad companies. Unless these are an exception to the rule, these securities must have increased enormously in market price and availability within the past year. All this should be considered when we think of the advance of something like 100 per cent. in the market price of its shares, and in estimating the probable or possible future profits of the company.

Further consideration of this important document must be postponed.

AMERICAN AND ENGLISH LOCOMOTIVES.

Probably under no other circumstances would the differences between the details of construction employed here and in Europe be so apparent as if an engine of a distinctively American type were designed and built there. Such an example we have in the "Mogul" engine, of which engravings are published on another page. The general plan of this engine is American, which, if current reports and traditions are true, originated in this country. Its merits commended themselves to the former Locomotive Superintendent of the Great Eastern Railway, who designed the engine of which we publish illustrations on another page, which are copied from *Engineering*.

The first and most distinctive difference in the design of the engines is the plate frames. These are made of plates 1½ in. thick. The jaws for the journal boxes are cut out of the plates, and they are otherwise shaped into the most economical and convenient form. As is well known, in this country frames are universally made of what are called "solid" bars, that is, bars of rectangular section from 3 to 4 in. wide, and from 2½ to 4½ in. in depth, to which the jaws, or "horns," and the necessary braces and stays are welded. These frames are planed and shaped over their whole surface, whereas those of the European type are finished or shaped only on their transverse surfaces and are not planed on their sides. It is claimed for the latter that, as each is made of a single rolled plate, their first cost is less than that of what will be called bar frames, and that, being planed on their transverse surfaces only, they cost less to finish than our frames do. We have no data giving the relative cost of the two kinds, but doubtless such information could readily be supplied from locomotive shops here and in England.

It is said, by English engineers, that our bar frames have not sufficient vertical stiffness, and that therefore it is necessary to attach them to the boiler by braces and stays, so that the required rigidity may thus be obtained. Not much importance is assigned to this argument, because it is evident that the weight of the wheels and most of the machinery is not carried on the frames at all, and there is never any difficulty in securing stiffness enough in the frames to carry their own weight. The only question then is concerning the weight of the boiler. In both European and American practice, it is customary to attach the frames to the boiler on the sides of the fire-box and smoke-box, and the weight of the latter and the cylinders then rests on the truck—if the engine has one—and the fire-box is supported directly by the springs and equalizing levers. The only considerations then which remain are whether the weight of these parts of the boiler, between the fire-box and smoke-box, should be self-supporting, whether it should in part rest on the frames, or whether, if the latter are not attached to the boiler, they will have enough rigidity to sustain the strains brought on them by the spring-hangers. That the barrel of the boiler has strength enough to support its own weight is at once apparent. In an engine like that represented by the engravings, it is evident that the only portion of the weight which must be supported by or is suspended to the frames is that which is sustained by the front hangers of the main driving-springs and the back hangers of the leading driving-springs. The weight of each of the driving-wheels on the rails is about 14,000 pounds. Deducting about 3,600 pounds from this for the weight of the wheels, axles, journal-boxes, springs, connecting-rods, eccentrics, straps, etc., which are not supported by the spring-hangers, we have only 10,500 lbs. which must be sustained by each frame. In point of fact, this want of vertical stiffness of our locomotive frames is an imaginary difficulty, and the most abun-

dant experience here has shown that it does not exist.

Bar-frames, on the other hand, are much stiffer laterally than plate-frames, and it is thought that, for this reason, there must be less difficulty in keeping up the journal boxes, which, if a fact, ought to show in the accounts of expenses for repairs.

But there is another argument used in favor of plate frames which has much greater force than that referring to their stiffness. It is said, and truly, that when they are used, fire-boxes can be made from four to six inches wider than they usually are in this country with bar frames. Attention has heretofore been called in these pages to this advantage. In the locomotive illustrated herewith, the inside of the fire-box is 40 $\frac{3}{4}$ in. wide, whereas the ordinary width in this country is about 35 $\frac{1}{2}$ in.; so that the grate surface and cubical capacity of the fire-box—an important matter—of the English engine is nearly 15 per cent. greater than it would be if made on the ordinary American plan. The value of this increase in the size of the grate and the capacity of the fire-box will not be discussed here; but it should be mentioned that its importance increases with the size of engines, because on a 4 ft. 6 $\frac{1}{2}$ in. gauge it is impossible to maintain a due proportion between the width of fire-box and the diameter of boiler when the latter is made, as boilers often are now, over 50 in. in diameter. The back view of the boiler of some engines of this kind remind one of a woman with broad shoulders who is laced tight. The vital organs of the locomotive in such cases, as well as those of the woman, are compressed into too small a space to act with the utmost vigor. When the wide fire-box is used, though, it is necessary to hang the springs under the axles, as represented in the engravings. If this is done, it is possible, by using a modified form of bar frames, such as that in use on the Boston & Albany Railroad, to get a wide fire-box. On this road these were made of the usual form employed in this country, but the portion on the sides of the fire-box is made of thin flat bars of about the same thickness as that of the plate frames. In this country, though, locomotive superintendents and master mechanics generally object to underhung springs, on account of the inconvenience attending the removal of driving-wheels when that is necessary. Undoubtedly that consideration should have some weight, because the mileage of an engine in busy seasons will depend very much upon the facility with which repairs can be made. On the other hand, an engine with a large fire-box will generate more steam than it could with a small one, and usually it will pull more cars over the ruling grade of a road with the former than it could with the latter, especially if the fuel is of poor quality. We are disposed to believe, then, that with large locomotives having boilers of 50 in. or more in diameter, the advantages gained by widening the fire-box more than compensate for the inconvenience resulting from the position of the springs. It will be noticed, though, that the clear space below the springs and the top of the rail in the engravings is only about 7 in. The driving-wheels of this engine are 4 ft. 10 in. in diameter, whereas those generally used in this country with engines of this type are from 48 to 52 in. in diameter. With these it would be found to be difficult to get clearance enough for the springs below the wheels.

The length of the driving-springs is 4 ft. 6 in., which is about 18 in. longer than the length usual here. Although long springs are more costly than short ones, it is believed that railroad companies would find the former to be in the long run more economical than the latter.

There is another feature in connection with these frames which is worth noting. It will be seen that the wearing surface for the journal boxes consists of a casting which is riveted to the inside of the plates. It is evident from the plan that, practically, these can be made as wide as is desirable, and in this engine they are 8 in., and the journals of the axles are 11 in. long, by 8 in. in diameter.

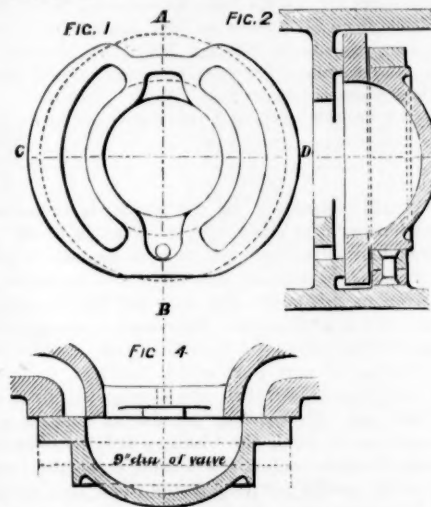
They are seldom made more than 7 or 8 in. long here. The English practice might be imitated to advantage.

The form of axle which is used in this, and we believe generally on English engines, is materially different from our practice. From the plan of the engine it will be seen that the wheel-seat is made about 1 $\frac{1}{2}$ in. larger in diameter than the journal, and the latter has an inside collar of the same size as the wheel-seat of the axle. The journal is then turned with a round corner, next to the collar and wheel-seat, having a radius, apparently, equal to the thickness of the collar. This evidently is a stronger form of axle, although considerably more expensive than one with the wheel-seat turned down smaller than the journal and with a sharp corner next to the latter, which naturally is the

place where the fracture occurs in case of breakage.

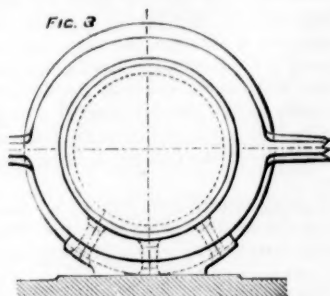
The form of tire used on these engines is also worthy of notice by American locomotive superintendents. The tires are shown in section in the plan, from which it will be seen that they are made with a lip which locks into a corresponding groove turned in the wheel-centre on the outside. The matter of tire fastenings has received more attention in Europe than we have given it, and now we believe few tires are put on wheels there without some safety appliance, besides bolts, for holding them in case of breakage.

Every draftsman who has ever laid out a locomotive with one pair of driving-wheels between the cross-heads knows the difficulty of getting room for the crank-pins without spreading the cylinders farther apart than is desirable. The collar of the crank always seems to be in the way of the cross-head. In the engine illustrated this difficulty is overcome in a very neat and effective way. It will be seen that the journal of the crank-pin is turned concave, and the bearing is, of course, made to fit it. This makes a collar unneces-



sary, as the shape of the journal holds the bearing in its place.

The valve-seats are placed above the cylinders, as is the universal practice in this country. It is hard for those accustomed to the convenience afforded by this form of construction to understand why English engineers have adhered so long to the plan of placing the steam-chests between the cylinders. The slide-valves are circular, and the shape of the valve-seat and ports is made to conform thereto, as is shown on the under side of the plan. This form of valve, we are informed, was used by Mr. Henry Waterman on



the Hudson River Railroad a good many years ago, but is now practically unknown and unused here. It has lately been brought into use in England, and is very highly recommended. No engraving of the valve of the locomotive illustrated was given in *Engineering*, but figs. 1, 2, 3, and 4 represents a similar valve which was used on a portable engine in England, and which will show the general form and proportions. It should be explained that in the portable engine the valve was placed and worked in a vertical position, and, therefore, a guide was provided in the under-side of the yoke, as shown in figs. 2 and 3. The valve-yoke, or buckle, is also circular, so that the valve can turn in it freely. The consequence is, that in working, it constantly changes its position, and thus wears uniformly all over the seat. The plan seems an excellent one, and well worth adopting here.

The peculiarities of the valve-gear will be apparent from the engravings. Instead of being connected directly with a rock-shaft, as is the practice in this country, the link is geared to a fixed rod connected to a form of rock-shaft placed as close to the cylinder as possible. The arms of this shaft, instead of being on the opposite sides of the latter, both extend downward, so that the motion of the eccentrics is not reversed. The only advantage of this arrangement seems to be that it is possible with it to suspend the link from both

sides, whereas, if the common form of rock-shaft is used, the link must be suspended from one side only. On the other hand, the plan shown in the engravings brings the link higher up, so that the boiler must be placed higher than usual to get room for the movement of the link.

The eccentric-rods, it will also be noticed, are attached to the ends of the links instead of to the back, as is the practice in this country. A longer throw of eccentric is therefore necessary with the former plan, for a given travel of valve, than with the latter, because the movement imparted to the link-block is less than that of the eccentrics even in full gear.

The link is counter-weighted with a dead-weight attached to an arm on the back side of the lifting shaft, a method long since abandoned in this country, where some form of spring is now universally used for this purpose.

Screw reversing-gear has not met with much favor from American locomotive superintendents, and, so far as we know, it has not been applied to any engines built here. That it permits a nicer and easier adjustment of the cut-off to the work done is obvious, but the objection made to it by master mechanics is that it is impossible to reverse an engine so quickly as with an ordinary reverse-lever. What the actual facts are we are unable to say.

The boiler has some features which differ materially from American practice. The outside diameter of the barrel is 54 $\frac{1}{8}$ in. and the plates are $\frac{5}{16}$ in. thick. It is not stated whether they are iron or steel. The circumferential seams are all made with butt-joints and a covering ring outside. The form of the longitudinal seam is not shown or described, but from a gentleman who has just returned from Europe we learn that butt-joints with covering plates or welts, both inside and outside, and four rows of rivets are now very commonly used for such seams. The strengthening ring, around the opening in the shell of the boiler at the base of the dome, is shown clearly in the longitudinal section. The crown-plate is supported by stay-bolts, but as no transverse section is shown, their arrangement cannot be known. From the engravings which are published from time to time of European engines, it may be inferred that that plan is now generally used on that side of the water. If properly designed, it is an excellent one, and in many respects superior to the system of crown-bars.

It is remarkable though that American engineers have never adopted butt-joints in locomotive construction. The superiority of that form of seam, and the facts that the plates are not subjected to transverse strains at the edges of the lap when it is used, and that to a very great extent, if not entirely, grooving or channeling is prevented when such seams are used, seem to be such strong recommendations that there should no longer be any doubt of its advantages.

The throttle-lever or "regulator," whistle and safety-valve all have a foreign look. The construction of the furnace door is not made apparent from the engraving. It is only clear though, that there is an inside deflection over the furnace door, an appliance much used in Europe, and of the benefit of which there can be no doubt.

There are other features in the construction of these engines which will strike any American who will study the engravings carefully as being different from our practice, but to which there is not room to refer now. Those interested in the construction of locomotives will find that a careful study of the engravings is a profitable exercise.

The criticism of the working of the swing truck in the descriptive article copied from *Engineering* will surprise our master mechanics. It is thought that the stability of the truck can be entirely controlled by the inclination of the links. The arrangement of two pins in the swing-hangers or links is not generally used here, but the links are suspended by one pin only, and the lower ends are inclined either toward or from each other. This will permit the truck to swing more or less freely in proportion to the inclination.

January Earnings.

For the month of January our table of earnings has reports from no less than 46 railroad companies, having in the aggregate 29,246 miles of railroad this year, which is about 35 per cent. of the total in operation in the United States, and 9.6 per cent. more than these companies worked during the corresponding month of last year. These roads earned in the aggregate this year \$18,933,465, and \$4,035,643, or 27.1 per cent. more than last year, their average earnings per mile of road having increased from \$558 to \$647, or 16 per cent.—truly an enormous increase, especially when we consider that so large a proportion of the road reporting is new. Of the 46 roads reporting, only four have smaller total earnings, and only six smaller earnings per

mile of road than last year. Many of the increases are very large; 24 more than 20 per cent., 17 more than 30 per cent., 10 more than 50 per cent., and two (Chesapeake & Ohio and Northern Pacific) more than 100 per cent. in earnings per mile. The largest percentages of increase, it is true, are on roads which still have small earnings per mile. The Northern Pacific, for instance, shows an increase of 121 per cent., and yet has smaller earnings per mile of road than any other of the roads reporting, and not one-fifth of the average. The largest earnings per mile are shown by the New York Central & Hudson River (\$2,548, or about four times the average); the Pennsylvania follows with \$1,707, and the Reading with \$1,421. No other road earned so much as a thousand dollars per mile in the month. These three roads, with about one-eighth of the total mileage, had nearly three-eighths of the total earnings. If we take them out of the account, the other 43 roads earned an average of \$466 per mile this year as against \$405 last, and their increase is about 15 per cent., against 20 per cent. on the three roads named.

Four of the roads reporting have a large trunk-line traffic, and nearly all their through traffic is carried at trunk-line rates. These and their earnings for the two years are:

	Gross Earnings.		Earnings per mile.		Inc. P. c.
	1880.	1879.	1880.	1879.	
Grand Trunk	\$730,096	\$689,321	\$574	\$496	\$78 15.7
St. Western	351,245	306,068	608	582	86 14.7
New York Central	2,593,613	2,024,812	2,548	1,989	559 28.1
Pennsylvania	3,083,551	2,543,424	1,707	1,482	225 15.2
The four roads	\$6,758,475	\$5,563,655	\$1,402	\$1,196	\$206 22.2

Thus all but the New York Central have increased about 15 per cent. in earnings per mile, and the Central nearly twice as much. The amount of the increase on the 1,018 miles of the New York Central is greater than that on the 1,806 miles of the Pennsylvania, which is remarkable, considering that the Pennsylvania gets the benefit of the enormously increased activity in the iron business, while the Central profits comparatively little by it, and the Pennsylvania is better situated to command the grain traffic of the Ohio valley and the southern grain region, which was a very large proportion of the whole in January, while the New York Central depends more upon the shipments from lake cities, which have been comparatively light this winter. It is notable, however, that the proportion of increase on the trunk lines has been very much larger than the average of the other 42 roads reporting—22.2 per cent. against 15 per cent. in earnings per mile of road.

The Northwestern spring-wheat roads—roads, an important share of whose traffic usually consists in carrying the spring-wheat produced in Wisconsin, Minnesota, and Northern Iowa—last year were suffering by the failure of the crop of 1878. In 1879, there was a tolerable crop, and a great increase in the area cultivated. No less than eight of the roads in our table belong to this class. With 5,998 miles of road in 1879, they earned \$2,038,477 in January; with 6,824 miles in 1880, they earned \$2,512,819. Their earnings per mile of road increased from \$340 in 1879 to \$368 in 1880, or about 8 per cent.—very much less than the average. It must be borne in mind, though, that these roads have increased their mileage no less than 13½ per cent., and that most of the new road is in a country as yet hardly beginning to produce.

There are six roads largely or chiefly engaged in carrying produce to Chicago that report. These, with 13 per cent. more road than last year, have earned 16 per cent. more money, and their average earnings per mile have increased from \$433 to \$446, or 3 per cent.

There are four roads reporting chiefly engaged in carrying to St. Louis. These, with an increase of 15½ per cent. in mileage, have had an increase of 17½ per cent. in their earnings, and their average earnings per mile have increased from \$390 to \$580 per mile, or 48.7 per cent.

At a time like this the remarkable roads are not those which show large increases in earnings, but those which show any decreases. These are for last January the Illinois lines of the Illinois Central, the Indiana, Bloomington & Western, the International & Great Northern, and the Toledo, Peoria & Warsaw. Three of these roads have their lines, or a large part of them, in Central Illinois, where we know of no special cause of a falling-off in traffic. In Texas very great damage was done to the crops by drought last summer; but while the International & Great Northern shows a trifling decrease in earnings, the Houston & Texas Central, which has a larger share of the traffic of the state than any other road, shows a large increase, and the Missouri, Kansas & Texas and the St. Louis, Iron Mountain & Southern, a very large part of whose business consists in carrying to and from Texas, show enormous increases in earnings and very much larger ones than ever before.

The comparison is made with a January not alto-

gether favorable; at least, January was not so good in 1879 as in 1878, though much better than in some previous years. Below we give the January earnings per mile of as many roads as we can for the past seven years:

	January Earnings per Mile of Road for Seven Years.						
	1874.	1875.	1876.	1877.	1878.	1879.	1880.
Atch. Top. & S. F.	\$123	\$135	\$187	\$199	\$229	\$309	\$411
Bur. C. R. & Nor.	255	249	229	201	300	270	575
Cal. & St. Louis	309	299	149	122	75	118	156
Central Pacific	776	746	756	717	537	500	524
Chicago & Alton	530	492	470	518	444	507	508
Chicago & East. Illinois	341	407	377	208	409	426	476
Chicago, Mil. & St. Paul	407	323	377	208	409	426	351
Chicago & N. W.	549	538	490	519	407	494	494
Cleve. Mt. V. & Del.	185	168	186	181	216	216	216
Grand Trunk	536	514	496	574	574	574	574
Great Western	584	1,116	682	682	682	682	682
Hannibal & St. Jo.	349	319	483	390	402	469	480
Illinois Central, in Illinois	613	520	506	507	478	478	478
Illinois Central, in Iowa	317	252	341	259	297	297	297
Ind. Bloom. & West.	441	359	398	290	351	391	340
Int. & Gr. Northern	343	238	316	251	261	314	312
Louisville & Nashville	406	494	512	493	579	579	579
Mem. Pad. & Nor.	187	131	144	134	163	163	163
Mo. & St. Louis	312	242	242	242	242	242	242
Mobile & Ohio	509	373	440	440	516	369	487
Nash. Chat. & St. Louis	436	508	441	509	451	509	509
Paducah & Eliz.	120	120	120	120	120	120	120
Pennsylvania	1,707	1,482	1,482	1,482	1,482	1,482	1,482
Philadelphia & Reading	975	832	1,197	1,421	1,421	1,421	1,421
St. L., A. & T. H. (Belleville Line)	514	806	540	724	504	682	722
St. Louis, Iron Mt. & So.	375	392	474	531	540	507	507
Toledo, Peoria & Warsaw	408	361	472	318	550	400	394
Union Pacific	594	550	604	781	609	683	824
Wabash, St. Louis & Pacific	329	402	535	469	495	495	495

Here there are reports from 29 roads for 1878, 1879 and 1880; from 27 of them for 1877 also; from 22 for 1876 also; from 16 for 1875 and 1874 also. Of these 29 roads, the earnings per mile compare in 1880 with previous years as follows:

24 out of 29 had larger earnings in 1880 than in	1879
18 " " " " " " " " " "	1878
13 " " " " " " " " " "	1877
13 " " " " " " " " " "	1876
9 " " " " " " " " " "	1875
9 " " " " " " " " " "	1874

Thus the comparison, on the whole, is favorable, with whatever year made. No less than 14 of the 29 roads had larger earnings per mile in January of this year than in any previous year for which its earnings are given in this table; two only had their smallest earnings per mile this year. Moreover, a considerable number of the companies have this year a considerable mileage of new road which has less, in some cases very much less, than the average earnings of their old road. The earnings per mile of the Chicago, Milwaukee & St. Paul, the Chicago & Northwestern, and the Wabash St. Louis & Pacific especially have been made smaller for this reason than they would have been otherwise. Doubtless in each one of these cases the earnings in proportion to capital invested are materially larger this year.

All the roads that have a trunk-line traffic—that prorate with the trunk lines on through freight between the West and the East, and so get the same through rates as the trunk lines—have been greatly benefited this year by the maintenance of east-bound rates, and will be still more in February than in January, as the rates were much lower last year in February. The whole improvement will not be shown in the gross earnings, for on some of these roads the traffic was much lighter this year. Besides the four roads mentioned in the above table as trunk lines, and there considered by themselves, the Chicago & Alton, the Indiana, Bloomington & Western, the main line of the St. Louis, Alton & Terre Haute, the Toledo, Peoria & Warsaw, and the Wabash, St. Louis & Pacific have more or less of such traffic, the last named a very large amount, while a large proportion of the business of all of the others, except the Chicago & Alton, consists of such traffic.

January was an unusually favorable winter month for operation, the weather being mild and little or no expense being incurred by reason of snow blockades, which last year were enormously expensive on several important roads. Thus, in spite of the higher prices of materials, the net earnings for this month may, on many lines, show a greater improvement, even, than the gross earnings. On the average, doubtless, expenses have been increased materially by the advance in the cost of materials, and will be more soon by the coming advance in wages.

Record of New Railroad Construction.

This number of the Railroad Gazette contains information of the laying of track on new railroads as follows:

Cumberland & Ohio, Southern Division.—Extended southward to Greensburg, Ky., 1½ miles.

St. Johns & Lake Eustis.—Extended southwest to Ft. Mason, Fla., 14 miles. Gauge, 3 feet.

Kansas City, Lawrence & Southern.—The Southern Kansas line is extended from Burden, Kan., west to Winfield, 17 miles.

Fl. Scott, Southeastern & Memphis.—Extended from Findley, Kan., southward to Coal Vale, 2 miles. Gauge, 3 feet.

Gulf, Colorado & Santa Fe.—Extended from Sealy, Tex., northward to Bellville, 13 miles.

Dubuque & Dakota.—Extended from Waverley, Ia., eastward to Tripoli, 14½ miles.

Denver, South Park & Pacific.—Extended westward to Arkansas Station, Col., 17 miles. Gauge, 3 feet.

Dayton & Southeastern.—Extended southeast to Coalton, O., an extension of 9½ miles new track. Gauge, 3 feet.

Atchison, Topeka & Santa Fe.—The Howard Branch is extended from Severy, Kan., to Howard, 13 miles. The

Cowley, Sumner & Ft. Smith Branch is extended from Winfield, Kan., south by west to Arkansas City, 13 miles. The Main Line is extended to Wallace, N. M., 38 miles.

Texas & St. Louis.—Extended from Sulphur Fork, Tex., west by south to Mt. Pleasant, 31 miles. Gauge, 3 ft.

Illinois Central.—The Kankakee & Western Branch is extended west to Pontiac, Ill., 9 miles.

This is a total of 192½ miles of new railroad, making 497 miles reported thus far in 1880, against 97 miles reported for the corresponding period in 1879.

NEW PUBLICATIONS.

Mr. G. E. Stechert, of No. 766 Broadway, has received from Germany the first part of a new treatise on "The Materials, Construction and Maintenance of Railroad Superstructure (*Die Materialien, die Herstellung und Unterhaltung des Eisenbahn-Oberbaues*), by George Obsthoff, an engineer of Oldenburg, who has had 14 years of practical experience with the subject in various parts of Germany and Austria. This first part (196 octavo pages, profusely illustrated,) is devoted to "Materials for Ballast and Track." A second part on "Materials for Switches and Crossings" will follow, and the work will close with a third part on "Laying and Maintaining the Superstructure." The author aims to describe all the methods of construction that have ever been tried that have the least merit. Under the head of "Iron Supports" he describes and illustrates no less than 60 different iron constructions that have been proposed as substitutes for ties. It is intended to be pre-eminently a practical work, and in turning over its leaves we see none of the long algebraical formula which usually profusely ornament the pages of German technical books.

We have received a note from Mr. Thomas M. Cleeman, whose *Railroad Engineers' Practice* we reviewed in our issue of Feb. 21, explanatory of the latter portion of "Problem A," and taking some exception to our criticism. We are pleased to state that Mr. Cleeman's method, as explained, is quite correct, and only open to criticism as being somewhat obscure; for the average "field engineer," we think, would study a good while before he would catch the point. We take the more pleasure in making this correction, as we were pleased with the general spirit and make-up of the book, regretting only that Mr. Cleeman had not given a much longer time to its preparation. In this connection, however, we desire to enter a protest against the general tendency nowadays to publish "formule" of all sorts for this thing and that, without demonstration or other authority, and "professing to require only an ability to read for their successful application." "Rules can seldom be safely applied without a thorough understanding of the principles on which they rest," and we think the pocket-book system defeats its own end when it runs to this extreme. They become little more than pitfalls for the feet of the unwary. It would be well for the compilers of such volumes to remember that one of the most successful pocket-books ever published is somewhat unnecessarily and pedantically scientific, and that another and more recent one, although it can hardly be accused of pedantry, is somewhat over-profuse in explanation.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:
Chicago & Alton, annual meeting, at the office in Chicago, April 5.
Wabash, St. Louis & Pacific, special meeting, in St. Louis, May 5.

Dividends.

Dividends have been declared as follows:
Ft. Wayne & Jackson, 2 per cent. on preferred stock, payable March 25. The preferred stock represents old bonds of the company.
Chicago, Burlington & Quincy, 2 per cent., quarterly, payable March 15.
Chicago & Northwestern, 1½ per cent., quarterly, on the preferred stock, payable March 20.
New York & Harlem, 3 per cent. from profits of city line. This is in addition to the regular 8 per cent. from the lessee.

Foreclosure Sales.

The Macon & Augusta road was sold in Augusta, Ga., March 2, under foreclosure of the second mortgage, and bought by the Georgia Railroad Company, which owns all the bonds. The road is 78 miles long, from Camak, Ga., to Macon, and has always been worked by the Georgia Company.

The South Mountain road was again sold in Philadelphia, Feb. 29, under foreclosure of mortgage, and bought by J. N. Hutchinson. There is no track on the road, which is nearly all graded from Harrisburg, Pa., to Hamburg, 55 miles, with a branch of 20 miles to Reading, and a little work has been done between Hamburg and the Delaware.

The sale of the property of the New York, Housatonic & Northern Company, which was to have taken place at White Plains, N. Y., Feb. 28, was adjourned until March 13, in consequence of a protest filed by the trustees under the mortgage against the legality of the sale. One bid of \$130,500 was made by David S. Duncombe and Erastus F. Mead, and they claim that it was accepted by the referee.

Western Association General Passenger & Ticket Agents.

The following circular is issued by the Secretary, Mr. W. H. Dixon:

"The next meeting of this Association will be held in Cincinnati at the Grand Hotel, on Monday, March 15, at 11 a. m.

"The Central and Southern Associations will probably meet at the same time and place, as each has signified a desire to meet this Association; the former for the purpose of discussing the feasibility of consolidating the two Associations, and the latter to consider matters of mutual interest.

"It is therefore urged that there be a full attendance at this meeting, in order that business may be completed, if possible, before the meeting of the National Association, the following day."

RAILROAD EARNINGS IN JANUARY.

NAME OF ROAD.	MILEAGE.					EARNINGS.					EARNINGS PER MILE.				
	1880.	1879.	Inc.	Dec.	P. c.	1880.	1879.	Increase.	Decrease.	P. c.	1880.	1879.	Inc.	Dec.	P. c.
Atch. Top. & S. F.	1,152	875	277	31.7		\$473,500	\$314,732	\$158,768		50.4	\$411	\$360	\$51	14.2	
Bur. Cent. Rap. & No.	492	434	58	13.4		184,310	117,302	66,954		57.0	375	270	105	38.9	
Cairo & St. Louis	146	146				22,821	17,263	5,558		32.1	156	118	38	32.1	
Carolina Central	242	242				44,733	37,908	6,825		18.0	185	157	28	18.0	
Central Pacific	2,335	2,180	155	7.1		1,223,000	1,080,160	133,834		12.3	524	500	24	12.3	
Chesapeake & Ohio	435	435				202,335	188,067	113,068		128.1	465	204	261	128.1	
Chicago & Alton	840	878	162	23.9		502,285	343,737	158,548		46.1	598	507	91	18.1	
Chi. & Eastern Illinois	159	159				72,406	68,197	4,209		6.3	456	429	27	6.3	
Chi. & N. W.	2,182	1,729	453	26.6		763,000	591,175	171,825		29.1	350	342	8	2.3	
Chi. St. Paul & Minn.	2,289	2,159	130	6.5		1,135,000	1,008,321	126,679		12.6	494	407	87	21.4	
Cleve. Mt. V. & Del.	178	178				83,642	73,870	9,772		13.2	470	415	55	13.2	
Flint & Pere Mar.	157	157				33,808	28,427	5,441		19.2	216	181	35	19.2	
Grand Western	295	280	15	5.3		109,092	77,412	32,580		42.1	373	276	97	35.3	
Hannibal & St. Jo.	1,273	1,390	117	8.4		730,000	680,321	40,745		5.9	574	496	78	15.7	
Houston & Tex. Cent.	526	526				351,245	306,098	45,147		14.7	668	582	86	14.7	
Ill. Cent. Ill. lines	202	202				169,380	137,047	32,333		23.6	580	469	111	23.6	
Ind. Bloom. & West.	533	501	32	6.4		319,041	290,740	28,301		9.7	599	521	78	15.0	
Int. & Gt. Northern	873	854	19	2.2		417,236	375,891	41,345		10.3	478	357	121	31.4	
Kan. City, Ft. S. & G.	402	402				119,421	104,301	15,120		14.5	297	259	38	14.5	
Kan. City, Law. & So.	212	212				80,498	72,934	7,564		9.3	380	304	76	24.7	
Little Rock & Ft. S.	526	516	10	1.9		158,659	161,818	-3,159		-1.9	302	314	-12	-3.8	
Louisville & Nash.	176	160	16	10.0		59,043	34,926	25,017		71.7	341	218	123	56.4	
Mem. Paducah & No.	241	185	56	30.8		23,600	14,584	9,016		60.1	158	128	30	23.4	
Minn. & St. Louis	165	165				49,856	25,078	24,778		99.4	302	152	150	99.4	
Missouri, Kan. & Tex.	1,118	973	145	14.9		647,671	450,470	197,201		43.8	579	463	116	25.1	
Mobile & Ohio	115	115				19,328	15,354	3,974		25.8	168	134	34	25.8	
Nash. Chattanooga & St. L.	158	123	35	28.5		42,938	27,506	15,432		56.1	272	194	78	40.2	
N. Y. C. & Hud. R.	786	786				367,327	194,453	172,874		88.9	467	247	220	88.9	
N. Y. & New England	506	527	-21	-4.0		246,501	194,486	52,015		26.7	487	369	118	31.9	
Northern Pacific	349	349				205,634	157,278	48,356		30.7	589	451	138	30.7	
Ogden & L. Cham.	1,018	1,018				2,593,613	2,024,812	568,801		28.1	2,548	1,989	559	28.1	
Pad. & E. Iowa	275	275				170,000	127,070	42,930		33.8	618	462	156	33.8	
Pennsylvania	644	644				81,843	37,014	44,829		121.2	127	60	67	111.7	
Phila. & Reading	122	122				30,201	18,069	12,132		67.1	248	148	100	67.1	
St. L. A. & T. H. M. L. & E.	185	185				36,899	25,191	11,708		46.5	199	138	61	44.5	
St. L. Iron Mt. & So.	1,806	1,718	88	5.2		2,543,424	2,043,127	500,297		24.5	1,467	1,107	360	32.5	
St. Louis & San Fran.	926	800	126	15.8		1,316,080	957,215	358,865		37.5	1,421	1,107	314	28.7	
St. Paul & Sioux City	195	195				96,519	59,757	36,762		60.5	495	306	189	61.8	
Toledo, Peoria & W.	71	71				51,270	48,445	2,825		5.8	722	682	40	5.8	
Union Pacific	885	885				532,615	334,029	198,586		65.4	807	488	319	65.4	
Wab. St. L. & Pacific	516	328	188	57.3		195,090	79,399	115,691		146.5	379	242	137	56.6	
Wisconsin Valley	470	329	141	42.9		98,639	78,929	19,710		25.0	210	241	-31	-12.9	
Total, 46 roads	29,246	26,083	2,701	138		\$18,933,465	\$14,897,822	\$4,101,494		\$65,851	\$647	\$558	\$89	16.0	
Total increase			2,563	9.6				4,035,643		27.1					

ELECTIONS AND APPOINTMENTS.

Atlantic, Gulf & West India Transit.—Mr. Frank B. Papy has been appointed General Freight Agent. The duties of that office have heretofore been performed by the Superintendent. Mr. Papy was for many years on the Jacksonville, Pensacola & Mobile road.

Bennington & Rutland.—Mr. H. W. Spafford has been appointed General Freight and Passenger Agent, with office at North Bennington, Vt. He was formerly General Freight Agent only.

Chicago, Clinton, Dubuque & Minnesota.—At the annual meeting in Dubuque, Ia., Feb. 27, the following directors were chosen: James F. Joy, Detroit; F. Bartlett, Sidney Bartlett, J. A. Burnham, J. N. Dennison, A. Hardy, H. H. Hunnewell, Nathaniel Thayer, Nathaniel Thayer, Jr.

Chicago, Saginaw & Canada.—Mr. H. F. La Bar has been appointed General Freight Agent, with office at St. Louis, Michigan.

Cleveland, Columbus, Cincinnati & Indianapolis.—At the annual meeting in Cleveland, March 3, the following directors (one-third of the board) were chosen: George H. Russell, Cleveland, O.; D. S. Brown, Columbus, O.; A. G. Dulman, H. R. Baltzer, New York. The only new director is Mr. Dulman, who succeeds L. M. Hubby.

Corning, Cohanque & Antrim.—The offices of this road, and of the Fall Brook Coal Company, lessee, have been removed from Watkins to Corning, N. Y.

Detroit, Hillsdale & Southwestern.—The following officers have been chosen: President, John B. Alley; Vice-President, James M. Ashley; Secretary and Treasurer, Elijah Smith; General Manager, J. W. Smith. The road is now controlled by the Toledo & Ann Arbor Company.

Dubuque & Muscatine.—Mr. J. P. Farley is President, and D. G. Wilson, Vice-President of this new company.

Illinois Midland.—Mr. W. R. Travers has been appointed Treasurer for the Receiver.

Kansas City, St. Joseph & Council Bluffs.—Mr. J. R. Hardy has been appointed General Agent at Kansas City, in place of J. E. Smith, promoted to be General Freight Agent.

Lawrence.—At the annual meeting in Pittsburgh, Feb. 27, the following directors were chosen: G. W. Cass, A. L. Crawford, J. D. Layng, John B. Jackson, J. N. McCullough, Thomas D. Messler, R. W. Cunningham. The road is leased to the Pennsylvania Company.

Lehigh & Wilkesbarre Coal Co.—At the annual meeting in Philadelphia, Feb. 26, the following were chosen: President, Francis S. Lathrop; Directors, John S. Barnes, John N. A. Griswold, G. G. Haven, John Kean, Charles Parrish, Frederick A. Potts.

Louisville, Cincinnati & Lexington.—Mr. Joseph A. Dew has been appointed Train Dispatcher and Superintendent of Telegraph, in place of J. E. Reeves, who has gone to the Louisville, New Albany & Chicago.

Macon & Brunswick.—The directors of the company which has bought this road are: J. M. Couper, Brunswick, Ga.; J. A. Lane, Macon, Ga.; George H. Hazehurst, Dade County, Ga.; W. M. Johnson, New York. Mr. W. M. Johnson is President.

Manhattan Elevated.—Mr. Frank K. Hain has been appointed Assistant General Manager. Mr. Hain was formerly with the Baldwin Locomotive Works, in whose interest he visited Russia; was for a short time Superintendent of Motive Power on the Erie, and later Superintendent of the Keokuk & Des Moines, retaining charge of that road after its lease to the Rock Island and until the present time.

Marietta & Cincinnati.—At the recent annual meeting in Cincinnati the following directors were chosen: Wm. Waddle, Wm. F. McClintick, Chillicothe, O.; Henry C. Smith, W. W. Scarborough, James D. Lehner, R. M. Bishop, Geo. Hoadley, W. B. Loomis, Larz Anderson, John Waddle, Cincinnati; Robert Garrett, Thomas Whitridge, Baltimore. All these are re-elected except Messrs. Loomis, Anderson and John Waddle, who succeed John King, Jr., W. F. Burns

and J. Donnell Smith, of Baltimore. The board elected Wm. Waddle, President; C. A. Low, Secretary; Wm. F. McClintick, Treasurer; Wm. E. Jones, Register.

Mexican Central.—This company has been organized in Boston with the following directors: Charles C. Burr, E. W. Converse, Thomas Dana, Wm. S. Easton, A. B. Lawrie, Pliny Nickerson, Charles W. Pierce, Lucius G. Pratt, Wm. J. Rotch.

Missouri Pacific.—At the annual meeting in St. Louis, March 2, the following directors were chosen: D. K. Ferguson, Oliver Garrison, W. M. Samuels, St. Louis; John L. Stephens, Booneville, Mo.; Frederick L. Ames, South Easton, Mass.; S. H. H. Clark, Omaha, Neb.; Jay Gould, Russell Sage, Sidney Dillon, Thomas T. Eckert, A. B. Buckley, George J. Forrest, New York. The board elected Jay Gould, President; S. H. H. Clark, Vice-President; W. Arnold, Secretary; A. H. Calef, Treasurer and Assistant Secretary.

Mr. C. G. Warner, Auditor, has been appointed also Acting General Passenger Agent, in place of C. C. Cobb, resigned.

Mobile & Montgomery.—At a meeting of the board in Montgomery, Ala., Feb. 27, Messrs. Josiah Morris, of Montgomery, and W. H. Pratt, of Mobile, were chosen directors in place of Messrs. Anthon and Foster, resigned. The board then elected Mr. Morris President and Mr. Pratt Vice-President.

Montpelier & Wells River.—At the annual meeting in Montpelier, Feb. 25, the following directors were chosen: Joel Foster, Jr., Montpelier, Vt.; W. H. Bingham, Stow, Vt.; S. S. Thompson, Lyndonville, Vt.; D. R. Sortwell, East Cambridge, Mass.; E. C. Sherman, Boston. The board elected D. R. Sortwell, President; Joel Foster, Jr., Clerk and Treasurer; W. A. Stowell, Superintendent.

Nevada Central.—At the annual meeting, held Feb. 24, the following officers were chosen: Daniel B. Hatch, President; Robert S. Walker, Vice-President; C. W. Hinchliffe, Secretary; Richard Amerman, Treasurer and Acting Superintendent; Lyman Bridges, Chief Engineer.

Nevada Northern.—The officers of this new company are: President and Treasurer, Robert L. S. Hall; Vice-President, P. W. Johnson; Secretary, J. D. Negus; Chief Engineer and Superintendent, Lyman Bridges. Office at Battle Mountain, Nev.

Nevada Southern.—This company has been organized with the following officers: President, James H. Ledlie; Vice-President, Andrew Nichols; Secretary, J. D. Negus; Treasurer, Robert L. S. Hall; Chief Engineer and Superintendent, Lyman Bridges. Office at Battle Mountain, Nev.

Northern Central.—At the annual meeting in Baltimore, Feb. 26, the following directors were chosen: George Small, S. M. Shoemaker, B. F. Newcomer, Philadelphia; Thomas A. Scott, Wistar Morris, Samuel C. Hoey, George B. Roberts, Edmund Smith, J. N. Hutchinson, Dell Noblit, M. B. Sellers, Wm. Calder, Philadelphia.

Northern (New Hampshire).—Mr. Henry C. Sherburne, of Boston, has been chosen President.

Northern Pacific.—Mr. Adna Anderson has been appointed Chief Engineer, with office in St. Paul, Minn. Mr. Anderson was formerly on the Wabash road, and afterward Receiver of the Chicago, Danville & Vincennes, and is an engineer of long and varied experience.

Oregon Railway.—The officers of this new company are: President, Wm. Reid; Vice-President, Donald McLeay; Secretary, J. C. Todd; Chief Engineer, P. G. Eastwick; Attorney, Ellis G. Hughes. Office at Portland, Oregon.

Perkiomen.—Mr. George W. Yost has been appointed General Agent, with office at Norristown, Pa.

Philadelphia & Reading.—Mr. Eckley B. Cox has been chosen to fill the vacancy in the board of managers made by the death of Mr. Adolph E. Borie.

Pittsburgh, Ft. Wayne & Chicago.—Mr. T. Jackson has been appointed Division Engineer of Western Division, in place of C. D. Law, promoted to be Road-Master, office at Ft. Wayne, Ind.

Pittsburgh, Titusville & Buffalo.—The following circular is dated Feb. 16:

"Mr. W. S. Baldwin is this day appointed General Passenger Agent of this company, with his office at Buffalo, N. Y. His orders in relation to the passenger business will be regarded and obeyed accordingly."

St. Johnsbury & Lake Champlain.—The directors have chosen Horace Fairbanks President; Wm. P. Fairbanks, Treasurer; Albert W. Hastings, Clerk.

St. Johns & Lake Eustis.—The officers of this road are: President, A. J. Lane, Volusia, Fla.; Superintendent, T. J. Davies, Volusia, Fla.; General Freight Agent, Jeff Lane, Volusia, Fla.; General Agent, A. M. Beck, Jacksonville, Fla.

St. Louis & San Francisco.—At the annual meeting in St. Louis, March 2, the following directors were chosen: Ozias Bailey, James Tooker, St. Louis; James D. Fish, Jesse Seligman, Frederick Butterfield, Calvin Littlefield, Wm. F. Buckley, E. F. Winslow, E. D. Adams, New York; Francis B. Hayes, A. M. Nickerson, Alden Spence, Boston. Messrs. Nickerson and Spence represent the Atchison, Topeka & Santa Fe.

San Francisco & North Pacific.—Mr. James M. Donahue, late General Passenger and Ticket Agent, has been appointed Secretary. Mr. Peter J. McEllynn succeeds Mr. Donahue as General Passenger and Ticket Agent, and Mr. W. S. Mason has been appointed General Freight Agent.

Scioto Valley.—Mr. Charles H. Cory has been appointed Master Mechanic, taking charge March 1. Mr. Cory was formerly on the Cairo & Vincennes, and later on the Grayville & Mattoon. His office is at Portsmouth, Ohio.

Sioux City & Pacific.—Mr. Henry V. Ferguson has been appointed Auditor, in place of George T. Crandell, resigned.

Southwest Pennsylvania.—At the annual meeting in Philadelphia, March 2, the following were chosen: President, G. B. Roberts; directors, D. K. Davidson, J. H. Du Barry, John K. Ewing, Robert Hogsett, Strickland Kneass, Israel Painter, R. F. Ruff, Thomas S. Scott, N. Parker Shortridge, Edmund Smith, George A. Torrence, J. F. Wendling. The road is leased to the Pennsylvania Railroad Company.

Springfield Southern.—Mr. G. A. Barnes, Secretary, is appointed Purchasing Agent also. Mr. M. T. Smith is General Freight Agent and Amos Whitley, General Ticket Agent.

Stillwater & St. Paul.—At the annual meeting in Stillwater, Minn., last week, the following directors were chosen: John McKusick, David Bronson, H. R. Murdock, J. P. Isley, James Smith, Jr., J. Q. Adams, Charles H. Graves. The road is leased to the St. Paul & Duluth Company.

Texas & St. Louis.—General R. H. G. Minty is now Superintendent.

Toledo & Ann Arbor.—Mr. J. W. Smith has been appointed General Manager. He has been for some time connected with the Erie & North Shore Line.

Venice & Carondelet.—The directors of this new company are: Carlos S. Greeley, Russell Hinkley, G. A. Koerner, Adolphus Meier, John D. Perry, W. E. Richardson, Charles H. Shannon.

PERSONAL.

—Mr. John Richards, the well-known mechanical engineer, died recently, in Manchester, England. He was for many years head of the firm of Richards, London & Kelly, makers of wood-turning tools, in Philadelphia, but left that concern two years ago to start the American Standard Gauge and Tool Works, in Philadelphia, since merged in the Betts Machine Company, of Wilmington, Del. Leaving his son in charge of this business, he went to England and started the firm of Richards & Atkinson, in Manchester. Mr. Richards wrote several books, chiefly on wood-working machinery, and was also a frequent contributor to technical journals, both here and in England.

—Mr. C. C. Cobb, who recently left the Indianapolis & St. Louis, to take the position of General Passenger Agent of the Missouri Pacific, has resigned that office on account of ill health. He purposes taking complete rest for a time.

—Col. E. W. Cole has formally tendered his resignation as President of the Nashville, Chattanooga & St. Louis Company, but it has not yet been accepted.

—Mr. David B. Standish, one of the oldest locomotive engineers in New England, died in Stoughton, Mass., March 2, in the 63d year of his age. He went on the Boston & Providence road 41 years ago, and ran on that road continuously for 37 years. Four years ago the company retired him on a pension. He leaves two sons on the road, one a conductor and one an engineer. Mr. Standish was a lineal descendant of Miles Standish.

—Mr. Joseph Nickerson, a director and large stockholder in the Atchison, Topeka & Santa Fe, and President of the Pueblo & Arkansas Valley, died suddenly Feb. 28, at his residence in Boston.

—Mr. W. H. Cummings, General Western Freight Agent of the New York Central & Hudson River road, died suddenly at the Tift House, Buffalo, March 3.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Reports of earnings for various periods have been received as follows:

Year ending Dec. 31:	1879.	1878.	Inc. or Dec.	P. c.
Chi. & Eastern Ill.....	\$803,602	\$805,145	I.	\$88,457 11.0
Minn. & St. Louis.....	471,345	465,235	I.	66,110 16.3
Net earnings.....	186,940	138,667	I.	47,973 34.6
Six months ending Dec. 31:				
Mobile & Ohio.....	\$1,270,751	\$974,039	I.	\$296,712 30.5
Net earnings.....	585,164	323,287	I.	261,877 81.0
Month of January:		1879.		
Boston & S. I. Line.....	\$21,587			
Net earnings.....	13,236			
Houston & Texas Central.....	319,041	\$280,740	I.	\$58,295 22.4
Net earnings.....	153,977	100,572	I.	53,405 33.0
Pennsylvania.....	3,083,531	2,543,424	I.	549,127 21.6
Net earnings.....	1,360,098	1,019,331	I.	340,767 34.2
Second week in February:				
Flint & Pere Marquette.....	29,752	10,349	I.	10,403 53.9
Louisville & Nashville.....	139,000	107,000	I.	32,000 29.9
Minn. & St. Louis.....	11,672	7,152	I.	4,520 62.8
Third week in February:				
Chi. & Eastern Ill.....	21,416	14,573	I.	6,843 46.9
Cleve. Col. Cin. & Ind.....	92,807	72,953	I.	19,854 27.2
St. L., Iron Mt. & So.....	138,750	93,047	I.	42,193 43.8
Week ending Feb. 13:				
Great Western.....	85,400	98,085	D.	12,595 15.6
Week ending Feb. 21:				
Grand Trunk.....	195,067	173,358	I.	21,709 12.5

kets and receipts at the seven Atlantic ports have been, in bushels, for the past seven years:

Year.	Northwestern Receipts.	Atlantic Shipments.
1874.....	1,577,093	772,701
1875.....	1,859,010	495,562
1876.....	2,828,007	1,323,751
1877.....	2,516,562	1,016,305
1878.....	2,379,274	1,071,283
1879.....	2,791,234	1,063,992
1880.....	3,356,490	1,141,510

The receipts of the Northwestern markets for the week were much smaller than in the preceding week, but they have been exceeded in but two weeks of this year and in no corresponding week of previous years. The shipments of these markets were also very much smaller (43 per cent.) than in the preceding week, and smaller than in any other week of 1880 except one. The receipts at Atlantic ports, on the other hand, were the largest for five weeks, but 40 per cent. less in the corresponding week of last year, and one-fourth smaller than in the corresponding week of 1878, in which weeks of the two previous years rates were badly cut and the average received was not more than half as great as it has been this year.

Of the receipts of Northwestern markets, Chicago had 34 per cent.; St. Louis, 26.3; Toledo, 13.6; Peoria, 9.6; Milwaukee, 7.8; Cleveland, 5.5, and Detroit, 3.2 per cent.

Of the receipts at Atlantic ports, New York had 35.3 per cent.; Baltimore, 20.6; Philadelphia, 20.3; Boston, 16.6; New Orleans, 5.5; Portland, 1.5, and Montreal, 0.2 per cent. New York's receipts are the largest for five weeks; Boston's, the largest since November; Baltimore's, the largest for four weeks; New Orleans, the smallest since the middle of November. New York got a much larger proportion of the grain in February last year than it has this, but so did Baltimore. They have lost chiefly to Boston and New Orleans.

Exports from the Atlantic ports (excepting New Orleans) have been:

	Feb. 21, '80.	Feb. 14, '80.	Feb. 7, '80.	Feb. 22, '79.
Flour, bbls.	99,327	83,161	78,475	111,867
Grain, bush.	2,828,416	1,928,250	2,624,353	3,545,119

The exports have been increasing for several weeks, and in the last week were really very large. About 45.8 per cent. of the grain exported was wheat, and 52.8 corn. The wheat exports were ten and a half times the receipts at these ports for the same week; the corn exports a little less than their corn receipts.

Baltimore grain receipts in February were as follows:

	1880.	1879.	Inc. or Dec.	P. c.
Flour, barrels.....	81,780	112,726	D.	30,937 27.4
Wheat, bushels.....	606,412	1,480,206	D.	880,794 59.2
Corn.....	1,714,279	2,776,619	D.	1,062,340 38.3
Other grain.....	151,468	118,314	I.	33,094 28.0
Total grain.....	2,472,060	4,382,130	D.	1,910,040 43.6

Total flour reduced to wheat..... 2,881,044 4,945,760 D. 2,064,725 41.7

For the two months ending Feb. 29 the receipts were as follows:

	1880.	1879.	Decrease.	P. c.
Flour, barrels.....	154,694	200,519	45,825	22.9
Grain, bushels.....	4,946,349	7,451,571	2,505,222	36.6
Total, bushels.....	5,719,819	8,454,166	2,734,347	32.2

February exports were 24,520 barrels and 1,750 sacks of flour, and 2,638,954 bushels of grain.

Coal Movement.

Coal tonnages for the week ending Feb. 21 are reported as follows:

	1880.	1879.	Inc. or Dec.	P. c.
Anthracite.....	263,026	361,486	D.	98,460 27.2
Semi-bituminous.....	82,557	42,798	I.	39,759 92.9
Bituminous, Penna.....	47,438	.....	.....	.....
Coke, Pennsylvania.....	34,539	.....	.....	.....

The diminished production of anthracite is caused by the stoppage of production one-half of each week, under agreement. Prices of anthracite are improving.

Shipments from the mines in Cape Breton for the year ending Dec. 31 were: 1879, 228,859; 1878, 267,697; decrease, 38,838 tons, or 14.5 per cent.

Commerce of the Port of New York.

The arrivals at the port of New York during the month of February for the past four years have been:

	From Foreign Countries.	From Domestic Ports.	1877.	1878.	1879.	1880.
Steamers.....	69	107	113	114	169	111
Ships.....	20	33	45	3	1	2
Barks.....	108	161	152	204	3	2
Brigs.....	67	53	61	82	3	6
Schooners.....	90	68	66	78	610	330
Total.....	354	406	419	522	733	448

It appears, thus, that the arrivals from foreign countries were about one-fourth more than last year, and nearly one-half more than in 1877. The arrivals from domestic ports were 36 per cent. more this year than last, but 22 per cent. less than in 1877, when foreign arrivals were smallest. The arrivals of foreign steamers especially show a great increase since 1877.

Pacific Rates.

Pacific rates are to be restored. It is understood that a new agreement has been concluded between the Union and Central Pacific companies on the one hand and the Pacific Mail Steamship Company on the other. The terms reported are that the Pacific Mail's to receive a monthly subsidy of \$110,000, and it is further said that the two railroad companies are to take the China line, buying the steamers now employed in it. This last, however, is only reported, and it is said that the agreement is not fully completed as yet, though the main points are decided on.

Southwestern Association Rates.

The tariff of March 1 is as follows for east-bound freight from Missouri River points (St. Joseph, Atchison, Leavenworth and Kansas City):

Per 100 lbs.	St. Louis.	Chicago.	Milwaukee.	Toledo.
Class 1.....	.60	.75	.....	\$1.15
" 2.....	.45	.60	.....	.90
" 3.....	.30	.45	.....	.70
" 4.....	.20	.27	.29½	.40
Wool.....	.30	.50	.....	.....
Wheat.....	.20	.23½	.28	.....
Other grains.....	.15	.20½	.23	.....
Cured meats.....	.20	.27	.29½	.35½
Fresh meats, refrigerated cars.....	.35	.46	.48½	.....
Fresh meats, common cars.....	.30	.41	.43½	.....
Cattle and horses.....	\$50.00	\$ 7.50	.....	.....
Live hogs.....	40.00	47.50	.....	.....
Sheep (single deck).....	30.00	45.50	.....	.....
Per car.....	.....	.....	.....	.....
Ores, etc.....	.20	.27	.....	.....
Hay and hoop poles.....	.15	.20	.....	.....
Mill stuffs and fertilizers.....	.20	.25½	.....	.34

Rates to Louisiana, Hannibal, West Quincy and Burlington are the same as to St. Louis.

Cheese in lots of 10,000 lbs. or more is charged 35 cents per 100 lbs. to Mississippi River points and 46 cents to Chicago.

Crop Prospects.

The San Francisco *Alta-California* of Feb. 26 says: "The season has advanced far enough to enable us to foresee that 1880 will not be a year of prosperity to California. The abundant rains of December justified the hope of most abundant crops of grass and grains, but the exceptional cold of the last six weeks, without rain, has made a great change for the worse in the situation."

Sault Ste. Marie Canal.

The report of this canal shows that the first boat through last season passed up to Lake Superior May 2, and the last boat passed down Dec. 3. During the season there were 3,121 passages through the canal, the total tonnage being 1,677,071. The tolls collected were \$41,385.63. The total number of vessels in the Lake Superior trade is 225, with a registered tonnage of 117,150. The business showed a great improvement over 1878.

RAILROAD LAW.

Manslaughter—Liability of Conductor.

The full bench of the Supreme Court has just rendered a decision in the case of the Commonwealth against Charles H. Hartwell. This was an indictment for manslaughter, where-in the defendant was charged with negligence of duty, as conductor of a freight train on the Old Colony Railroad, at Wallston, in October, 1878, whereby another train was thrown from the track, and passengers were killed. At the trial in the Superior Court for Norfolk County, among other instructions requested, the defendant asked the Court to rule "that the averment that Hartwell knew that a certain train was then and there lawfully traveling on the railroad, and was about to arrive at Quincy near the Wallston station," was a material averment which must be proved by the Commonwealth, and there was no evidence in the case to support that averment. The Court declined to give this ruling, and the defendant alleged exceptions. This Court has now decided that the ruling should have been given, and that the defendant's exceptions on that point must be sustained.

The Court say that the negligence of the defendant was essential to support the charge of manslaughter. The specific averment that he knew that this particular train was then due, bears directly upon that question; and being set out in that part of the indictment which charges the negligence, it is descriptive of the facts and circumstances which surrounded the defendant at the time, in view of which he acted or failed to act, and of the kind and character of the negligence of which he is alleged to have been guilty. There being no evidence to support it, the conviction cannot be sustained.

This will probably end this case, as it is not at all likely that the case will be tried again.—*Boston Traveler*, Feb. 28.

THE SCRAP HEAP.

Railroad Equipment Notes.

The Pullman Company's car-shops in Detroit have just turned out a very handsome sleeping car for the Connecticut & Passumpsic Rivers road. They are now building eight hotel cars, 10 narrow-gauge sleeping cars, 62 cars for the Metropolitan Elevated road in New York, and several passenger cars for the Wabash.

Billmyer & Smalls, at York, Pa., have taken a contract to furnish passenger and freight cars for a new railroad in Japan.

The Lehigh Valley shops are building 10 heavy engines, two of which are to have Wooten's coal-dust-burning fire-boxes.

The Lobdell Car Wheel Co., at Wilmington, Del., is very busy, turning out 300 car wheels a day.

The Jackson & Sharp Co., at Wilmington, Del., has a large number of cars in progress. In the ship-yard several vessels are being repaired, and four car-floats built for the New York, New Haven & Hartford road.

The Harlan & Hollingsworth Co., at Wilmington, Del., is running its car-shop full on orders for various roads. In the ship-yard there are now in progress an iron steamer for the Albany Day Line on the Hudson River; a ferry-boat for the East River, New York; a large car-transfer boat, to run between Canton and Locust Point, Baltimore; and a large ferry-boat for the Potomac Steamboat Co., to run between Washington and Quantico.

The government of Japan has ordered of H. K. Porter & Co., builders of light locomotives, Pittsburgh, Pa., two narrow-gauge mogul locomotives for a road to be built in American style. There are now two short roads in Japan, built by English engineers at a most extravagant expense, over perfectly level ground, so that there will now be a practical test made between the two systems. This is the first introduction of American locomotives into the Empire of Japan, and also, perhaps, into Asia.

The Gilbert & Bush Car Co., at Troy, N. Y., is building 15 sleeping cars for the Wagner lines, and a large number of passenger and freight cars for other companies, including some for a railroad in Nicaragua.

The United States Rolling Stock Co. is building at its Chicago shops 500 box cars intended to carry 20 tons each.

The Connecticut River shops at Springfield, Mass., are building two combination cars for branches of the road. They are 45 feet long, with a baggage room 12 feet long.

The Cleveland (O.) Bridge and Car Works have just finished 300 box cars for the Kansas Pacific, and 400 for the Cleveland, Columbus, Cincinnati & Indianapolis, and have contracts for 850 more.

Iron and Manufacturing Notes.

The Delaware Rolling Mill, at Phillipsburg, N. J., is working full time, making merchant bar iron.

A company has been organized to build a blast-furnace at South Chester, Pa. Messrs. Samuel M. Felton, S. A. Crozer and other capitalists are concerned in it.

The Barnum-Richardson Co. will start up its blast-furnace at Van Deusenville, Mass., as soon as a sufficient stock of charcoal is on hand.

B. Atha & Co., makers of crucible steel, at Newark, N. J., are preparing to build Bessemer steel works in addition to their present plant.

Seidel, Hastings & Co., at Wilmington, Del., are running their rolling mill on plate iron for ship-building purposes.

The Christiana Iron Co., at Wilmington, Del., will soon start a new rolling mill to make plate iron.

The Lyons Asbestos Paint Co., whose factory in New York was latly burned, is now established in permanent quarters at No. 197 Pearl street, New York.

The Columbia Car Spring Co., in New York, sustained no damage by a recent fire as reported, but the works are now in the usual order.

Bridge Notes.

The Delaware & Hudson Canal Company has recently

built several short iron bridges chiefly of old iron rails. They were designed by Chief Engineer Wentz and Bridge Inspector Arthur Wurtele, and built at the company's shops in Albany.

The Delaware Bridge Co., of New York, is building an iron draw-span over the Passaic River on the Newark Branch of the New York, Lake Erie & Western road.

Inventories.

Some scientific person has started the statement, which is being extensively copied, that a wooden bridge is much stronger than an iron one of the same weight.

A good story comes to us from the Southern Railroad of New Jersey, which recently passed under the control of the Central Railroad. General Ticket Agent Baldwin sent down to one of the ticket agents along the line of the road for an inventory of the effects of his office, and the obliging subordinate promptly packed up and sent to headquarters his tickets, ticket case, stamp, books, etc., and sent word that "as soon as the stove cooled off he would send it too."—*Easton Express*.

Thé Burlington *Hawkeye* tells a pleasing story of a self-sacrificing traveler, who devoted his energies to the work of devouring everything upon a certain railway section dining counter, and having accomplished the feat, walked away, saying: "There! the next fellow who comes along here will get something fresh."

There are always compensations when you come to think of it. Our grandfathers had no railroads, and they had to put up with a good many inconveniences, but then, there were no train-boys in those days.

Creosoting Bridge Flooring.

A contract has been made by the trustees of the Brooklyn Bridge with Mr. Edward R. Andrews, owner of the Hayford system of creosoting, to creosote all the planking required in the construction of the bridge—about 1,100,000 ft.

Fast Time.

Vice-President Newcomb, General Manager De Funiak and Directors Murrell and Clark, left here on a special train at 2:20 p. m., and arrived at Louisville at 6:43 p. m.—in four hours and twenty-three minutes—the fastest ever made over that line. The train ran from Nashville to Edgefield Junction, a distance of 10 miles in 11 minutes; from Nashville to Bowling Green, 72 miles, making two stops—at Sinking Creek for water, and at Memphis Junction—in an hour and 32 minutes. H. Patrick was the engineer, and the engine was No. 69.—*Nashville American*, Feb. 29.

OLD AND NEW ROADS.

Alabama Great Southern.—This company now has trains running on the branch from Attalla to Gadsden, Ala., 5½ miles. This line was built several years ago as part of the East Alabama & Cincinnati road, but has not been worked regularly.

Antioquia Railroad.—A committee appointed by the government of the state of Antioquia, United States of Colombia, consisting of Luis E. Villegas and Carlos Velez, has recently made a report to the Secretary of the Treasury Department of that state concerning the condition of the enterprise, and its probable effect on the fortunes of the state and of Colombia. From their report it appears that this road on the first of January last was open from Puerto Berrio, on the Magdalena River in the interior of Colombia (presumably the head of navigation for small steamboats) to a point called La Malena, a distance of some 9½ miles. At that time rails were laid for ten miles, and grading finished a mile and a half further, in which latter distance four bridges were to be built. It was equipped with one locomotive, 10 large and 4 small flat cars, 20 dump cars and 4 hand cars, and 500 tons of rails were on hand for the extension of the line, and a 12-ton Forney locomotive was under construction, and two passenger cars, two box cars and two flat cars were on the way. A telegraph line has been constructed along the line from Puerto Berrio to Medellin, the capital of Antioquia.

The grantee of this enterprise is Mr. F. J. Cisneros, an engineer well-known in the city of New York, where he had an office for some years. The report speaks in the highest terms of the energy and ability of Mr. Cisneros. To connect his railroad with the sea he has procured three small steamboats and two steam yachts. We believe that these do not go to the mouth of the Magdalena (on the Caribbean Sea due south of the east end of Cuba), but to a point near the mouth, where there are long-established means of transportation. The climate on the Magdalena is very unhealthy, and, in view of this, the report suggests that a pension be paid to the families of laborers on the railroad who may die. They say:

"No doubt, on account of the trying climate, the high wages paid to laborers here are not a sufficient inducement to them. As the railroad is, unquestionably, of the utmost importance to the state, as the industrial future and a large proportion of the industrial resources of Antioquia depend upon it, the work should receive additional care and attention from the commonwealth. It strikes us that among other desirable steps to be taken for the purpose of securing laborers, it would be well to present a pecuniary gratuity to the families of such as should die after having been in the employ of the railroad a certain number of years.

"Really, Mr. Secretary, we do not think that he better serves the state who dies upon the field of battle, contending, perhaps, for a chimerical idea, or for liberties it may be impossible to secure, than he who gives his life a sacrifice to labors from which Antioquia awaits industrial redemption. This suggestion may not be entertained, but it is honest; it may be opposed, but it is wholesome."

Lamenting that a formal celebration of the opening of this first railroad in the state had not been decreed by the government, the report says:

"The opening of the first railroad built in the interior of our country is well deserving of the honors of a great national holiday in which should participate, through worthy and proper representatives, all the state governments and the Union as well. Do we not constantly celebrate, with noisy demonstrations, such and such a conflict, which cost the republic rivers of blood, millions of treasure, the loss of much of its morality and discredit in the eyes of the world? Do we not build arches and give wreaths to the fortunate general who defeated his brothers in such and such a place, with no other profit to the state or republic from the ruinous strife than the rise of a new chieftain or another tyrant? Why, then, should we not celebrate, with all the pomp they deserve, these triumphs of peace, so fruitful in industrial advancement—triumphs which lead to wealth, science and morality, without injuring any one, and that reveal a wider horizon and a brighter future to the sons of this country, struggling, as they are, on the brink of dissolution, and who can be saved only by that labor and that industry which shall stamp out the symptoms of anarchy with which they are surrounded even now."

The citizens who prepared this report apparently never had seen a railroad before. They approached from the mountain city Medellin by mule roads, it would appear; and they express their first experience of railroad travel (on a platform car, it seems) as follows:

"At 6 p. m. we took the train, and at 7:11 reached the

station at Puerto Berrio. [About 9½ miles.] It would be difficult for us adequately to describe to the Secretary the agreeable impression made upon us by our rapid ride over the road upon the train, and the comfort afforded by that class of conveyance, after and as compared with the tedium, discomfort and inconvenience of travel on mule-back over our mountains. Nor would it be less difficult for us to describe the amazement with which we contemplated the results of the courage, self-denial, energy and constant perseverance of Mr. Cisneros and his assistants in laying rails upon a desert soil so swampy and unhealthy as that between La Malena and Puerto Berrio. Such stupendous work satisfied us at once that the enterprise would be carried to a full and successful issue. Surely the skill that could overcome the apparently insurmountable obstacles upon the line between Puerto Berrio and the Malena station at La Bodega will, as a matter of course, remove the lesser obstructions presented by the rest of the line."

The names of all the principal employés of Mr. Cisneros are given in the report, many of them being, apparently, Americans. O. R. Yeatman is Resident Engineer at Puerto Berrio; Miller A. Smith, Division Engineer; Chimaco Villa, Juan de Dios Martinez, Fernando Ysaza and Angel Perez, assistant engineers. Mr. S. W. Plume is Superintendent of Construction.

Atchison & Nebraska.—The question of a lease of this road to the Chicago, Burlington & Quincy Company is to be submitted to the stockholders at a special meeting.

Atchison, Topeka & Santa Fe.—The Howard Branch, formerly the Kansas City, Emporia & Southern, is now completed to Howard, Kan., 13 miles beyond Severy (late Salt Creek), the late terminus, and 75 miles from the main line at Emporia.

The Cowley, Sumner & Ft. Smith Branch now has trains running from Winfield to Arkansas City, Kan., 51 miles south by west from Wichita, and 13 miles beyond the late terminus at Winfield.

In the Douglas County (Kan.) Court, Feb. 28, a suit was begun by the old St. Louis, Lawrence & Western Company to recover possession of the road from Lawrence, Kan., to Pleasant Hill, Mo., now in possession of this company under lease. The suit is based upon a claim that the sale of the road under foreclosure in 1876 was illegal, and that consequently the organization of a new company and the lease to this company are void.

The track of the main line is now completed to Wallace, N. M., on the Rio Grande, 38 miles beyond the point reached at the close of last year, 93 miles beyond Las Vegas, and 869 miles from Atchison.

Atlantic & Great Western.—Instead of laying a third rail throughout its length, as was at first proposed, this road will lay a third rail from Salamanca to Leavittsburg (165 miles), but from Leavittsburg to Dayton (224 miles) will simply reduce the gauge from 6 ft. to 4 ft. 8½ in. so that the western terminus of the 6 ft. gauge will be at Leavittsburg. This will reduce the amount of new rails that it will be necessary to purchase, and this will be further reduced by taking up the two rails of the 6 ft. gauge on the Mahoning Division (which straddles the standard-gauge track already on this division) from Cleveland to Leavittsburg, 49 miles. Then there will be left on which to wear out the 6 ft. gauge equipment (there is not a great deal of it) the 165 miles between Salamanca and Leavittsburg. To complete a through line of standard gauge the New York, Lake Erie & Western will lay a third rail on its Western Division from Hornellsville to Salamanca, 80 miles. Thus by laying rails sufficient for 123 miles of track (partly furnished by taking up 49 miles of 6 ft. track), this important line will be given a track of standard gauge throughout. When these changes are made, which is to be by June next, the New York Central will be as well able as the Erie to interchange traffic with the Atlantic & Great Western, and by the terms of the recent agreement the Erie will make no objection to this, getting for its part an equal opportunity to interchange traffic with the Lake Shore and the other roads west of Buffalo.

Baltimore & Ohio.—In the United States Circuit Court at Pittsburgh, Feb. 27, the Pittsburgh & Connellsville Company confessed judgment in favor of this company for \$4,354,748.86. The judgment is for advances made and interest paid on guarantee of bonds. It is said that the intention is to sell the Connellsville road under the judgment and thus transfer its ownership absolutely to the Baltimore & Ohio.

Boston & Albany and Boston & Providence Consolidation.—At the regular meeting of the Boston & Albany board held Feb. 26, it was voted to make a formal offer to the Boston & Providence Company to consolidate the two companies on even terms, share for share.

The Rhode Island Legislature has instructed the Judiciary Committee to inquire and report whether it be expedient to take any action to forbid the consolidation of the Boston & Providence with any other company.

A bill to authorize the consolidation is now pending in the Massachusetts Legislature. It is, we believe, favored by the Railroad Commission.

Brattleboro & White Hall.—At a meeting held in Brattleboro, Vt., Feb. 28, the stockholders voted to lease this unfinished road to the New London Northern Company. By the terms of the lease the company is to hand over all the property and material on hand, and also the \$145,500 bonds unissued of the \$150,000 authorized. The lessee is to finish the road from Brattleboro to South Londonderry, making it of such gauge as it may think best, and to equip and operate it, paying 6 per cent. interest on the bonds, \$600 a year for right of way leased of the Vermont Valley and \$400 a year to keep up organization. Should the cost of the road exceed the amount of the bonds, the lessee is to advance the balance and repay itself from the earnings of the road. After payment of this construction debt, should there be any, any surplus earnings remaining after payment of interest are to be divided equally between the lessee and the lessor.

Chicago & Iowa.—The annual meeting of this company on March 3 was stopped by an injunction sued out to prevent F. E. Hinckley from voting on certain stock claimed to have been fraudulently issued.

Chicago, Burlington & Quincy.—At the special meeting in Chicago, Feb. 28, the stockholders voted to approve the agreement of consolidation with the Burlington & Missouri River in Nebraska, and also the increase of the capital stock by 20 per cent. There were 267,478 shares voted in favor of ratifying the agreement, and only 2,552 against, a total vote of 270,030 shares out of 308,836.

Chicago, Milwaukee & St. Paul.—This company is having a survey made for a line from Hastings, Minn., eastward to the Chippewa River in Wisconsin, a distance of about 40 miles. It is intended to reach the lumber country along the Chippewa and the lumber business of that river.

Choptank & Delaware Ship Canal.—A bill is before the Maryland Legislature to charter this company to build a canal from Ferry Creek, Md., on the Choptank River, to Walnut Landing, on the Nanticoke, following that river to

the Delaware state line, and thence across to Delaware Bay, just above the Breakwater. This project requires about 38 miles of canal and the deepening of twelve miles of the Nanticoke; the distance through it from Baltimore to Delaware Bay is about 130 miles.

Columbus & Rome.—The grading on this road is now completed to Belmont, Ga., 32 miles from Columbus, and track is laid 28 miles from Columbus and four miles beyond the late terminus at Hamilton. The contract for all the work, grading, bridging and tracklaying, is now held by Johnson & Fleming.

Columbus, Chicago & Indiana Central.—Suit has been begun to recover from this company \$113,829 with interest from Feb. 1, 1869, and \$7,434, with interest from Jan. 1, 1872, amounts claimed as internal revenue tax due the United States and not paid when due.

Cumberland & Ohio, Southern Division.—This road is completed to Greensburg, Ky., 30½ miles from the junction with the Louisville & Nashville, at Lebanon. It is built and leased by the Louisville and Nashville Company.

Dallas & Wichita.—Surveys are being made for the extension of this road from Denton, Tex., to Whitesboro, 28 miles, to connect with the Missouri, Kansas & Texas, Denison & Pacific line. Denton is 38 miles from Dallas, the road being in operation for 21 miles of that distance, and graded from Lewisville to Denton, 17 miles.

Dayton & Southeastern.—This road is now completed and opened for business to Coalton, O., 29 miles southeast from Chillicothe, O., and 109 miles from Dayton. This makes the total length of track owned by the company 101½ miles, its trains using the Marietta & Cincinnati track (with a third rail) from Baker Junction to Byer Junction, 7½ miles.

Denver & Rio Grande.—A mortgage to secure \$30,000,000 of bonds to be issued has been recorded in Colorado. Of the new issue, \$7,422,500 are to be held to retire bonds of the company now outstanding.

The company is about to build a short branch from Colorado Springs, Col., to Manitou, which is now becoming a considerable summer resort.

Denver, South Park & Pacific.—Trains on this road began on Feb. 11 to run to Arkansas Station, 133 miles from Denver, Col., and 17 miles beyond the point which the track reached at the close of 1879. It is nearly completed to Buena Vista, two miles further.

Detroit, Hillsdale & Southwestern.—As heretofore reported, this road has passed into the hands of the owners of the Toledo & Ann Arbor. The two roads will be worked together, with the same officers and will be practically one line. This road extends from Ypsilanti, Mich., on the Michigan Central, southwest to Banker's on the Ft. Wayne & Jackson road, 65 miles. It crosses the Toledo & Ann Arbor at Ypsilanti Junction, six miles from Ypsilanti and 40 miles from Toledo. The two make a line from Toledo to Banker's something like a letter V.

Dubuque & Dakota.—This company has just completed and opened for business an extension from Waverley, Ia., on the Cedar Falls & Minnesota line of the Illinois Central, eastward to Tripoli in Bremer County, a distance of 14½ miles. This makes the road 55½ miles long in all.

Dubuque & Muscatine.—This company has been organized to build a railroad from Dubuque, Ia., southward by Wyoming, Clarence and Milton to Muscatine, about 80 miles.

Elizabeth, Lexington & Big Sandy.—Contracts have been let to Warner, Tabler & Co. for the grading of 36 miles from Mt. Sterling, Ky., eastward, and to C. R. Mason & Co. for 31 miles west of Straight Creek. Nearly the whole line from Mt. Sterling to Huntington is now under contract.

Evansville, Terre Haute & Chicago.—The stockholders of this company have voted to approve and confirm the lease of the road to the Chicago & Eastern Illinois Company. The rental is to be \$75,000 a year, and it is provided that, with the consent of the bondholders, the existing indebtedness is to be refunded at 6 per cent. There are now \$755,000 first and \$325,000 second mortgage bonds, with about \$50,000 floating debt, the bonds bearing 7 per cent. interest. The road extends from Danville, Ill., south to Terre Haute, Ind., 55 miles.

Flushing, North Shore & Central.—Notice is given that New York & Flushing Railroad bonds maturing March 1, 1880, will be bought, at par and accrued interest, by Drexel, Morgan & Co., of New York. These bonds are a first lien on the line from Hunter's Point, N. Y., to Flushing, and the amount outstanding was only \$25,000 by the latest statement.

Ft. Scott, Southeastern & Memphis.—This little coal road has been extended from the late terminus, at Findley, Kan., southward two miles to Coal Vale, making it 16 miles long. It is owned by the Kansas City, Ft. Scott & Gulf Company.

Galveston, Houston & Henderson.—This company has voted to authorize the issue of second-mortgage bonds to an amount sufficient to fund all over-due coupons on the first mortgage bonds.

Gulf, Colorado & Santa Fe.—This road is now completed to Belleville, in Austin County, Tex., 107 miles westward from Galveston, and 13 miles beyond the late terminus at Sealy.

Hudson River Tunnel.—The tunnel excavations on this work are now reported as about 60 feet out from the shaft in Jersey City which is the starting point, the excavation being 60 feet below the surface of the river. Part of the iron framework is in place and the work of putting in the brick arching has been begun.

Illinois Central.—This company's statement for January gives the earnings for the month as follows:

	1880.	1879.	Inc. or Dec.	P. c.
In Illinois.....	\$417,236.00	\$475,891.05	D. \$58,655.05	12.3
In Iowa.....	119,421.00	104,301.04	I. 15,119.96	14.5
Total.....	\$536,657.00	\$580,192.09	D. \$43,535.09	7.5
In January, 1880, the Land Department report sales of 3,840.60 acres of land for \$24,651.19. Cash collected on land contracts was \$15,506.02.				

The Kankakee & Western Branch is now completed to Pontiac, Ill., 21 miles from the starting point near Kempton on the Chatsworth Division. This branch is to be extended 22 miles further to Minonk on the Northern Division.

Intercolonial.—Sealed proposals will be received by D. Pottinger, Chief Superintendent, at Moncton, N. B., until March 10, for ballasting the Riviere du Loup Division. Specifications and forms of tender may be had at the engineer's office, Moncton, or of the agents of the road at St. John, Halifax, Point Levis or Montreal.

Kansas City, Lawrence & Southern.—This company's Southern Kansas line is now completed to Winfield, Cowley

County, Kan., 17 miles from the late terminus at Burden and 82 miles westward from the main line at Independence. Winfield will be the terminus for a time.

Lake Shore & Michigan Southern.—On March 1 this company restored the wages of its employés to the rates paid before the reduction of July, 1877.

Limerick & Waterboro.—It is proposed to build a railroad of 2 ft. gauge from Limerick, Me., southeast through Waterboro Centre to a point on the Portland & Rochester road. The distance is about 10 miles, and the estimated cost \$50,000.

Longfellow Mining Co.—This company has completed a railroad of 20 inches gauge from the Longfellow Mine, in Arizona, to its smelting works, a distance of about five miles. It is equipped with eight cars, which carry three tons of ore each. Mules are the motive power at present, but a locomotive has been ordered and will soon be on the road.

Louisville & Nashville.—The directors have approved the contracts entered into for the lease of the Pensacola road, and also those with the Georgia and Central of Georgia companies.

Macon & Brunswick.—The purchasers of this road from the state of Georgia took formal possession March 1. An attempt to enjoin the transfer was made, but too late, by Mr. E. T. Paine, who claims that he is entitled to the lease of the road.

The Atlanta Constitution of Feb. 29 says of the sale of the road: "The Macon & Brunswick sale has at last been completed. Yesterday the final negotiations were had, and Governor Colquitt agreed with the purchasers as to the title of the road. It will be remembered that on the 12th the representatives of the purchasers came to Atlanta to consult with the Governor as to arrangements to consummate the purchase made for them at Macon by Mr. J. M. Couper, of Brunswick, when the road was offered at public outcry. There was a failure to agree as to the title; the purchasers asking that the Governor give them a warranty, and the Governor, under the advice of the Attorney-General and Judge Bleckley, declined to do so. Subsequent to this disagreement negotiations were reopened in New York, and there was a prospect of a final adjustment of all difficulties."

"Yesterday this result was accomplished, after a full and free consultation satisfied all parties concerned. The following gentlemen compose the company which has thus gained the road: J. M. Couper, of Brunswick; J. A. Lane, of Macon; George H. Hazlehurst, of Dade; W. M. Johnson, of New York. It is generally understood that, while these gentlemen compose the company, the capital is mainly supplied by R. T. Wilson & Co., of New York, and associates in this enterprise."

"The act authorizing the sale or lease of the road is of rather peculiar construction. Mr. Couper bid for the lease of the road, and it was 'knocked down to him at \$194,000 a year. The company he represented, of course, intended to take advantage of a clause in the act which would allow them to pay the difference between this and the sum requisite to make them purchasers. The lease was first arranged, however, yesterday. According to the act, the lessees had to give a bond for \$500,000 conditioned on their fulfillment of obligations and the return of the road in as good a condition as they received it. As the lessees intended to become purchasers at once, the bond was a mere matter of form, but was duly tendered and accepted."

"The following gentlemen went on the bond, \$100,000 of which was required to be in the state: L. P. Grant and W. P. Orme of Atlanta, J. M. Johnson of New York, and C. M. McGhee, Vice-President of the East Tennessee, Virginia & Georgia Railroad. As soon as the lease was thus effected the purchase was made for the sum of \$1,125,000. Ten thousand dollars had been paid to the Governor by Mr. Couper as a bonus on the day the road was leased. The remaining \$240,000 was paid yesterday. As the law required the payment in bonds of the state of the United States, it gave to Treasurer Renfro an opportunity which he used finely. The entire issue of 4 per cent. bonds for this year (\$200,000) was ready, and he disposed of the whole lot to the purchasers, who used them to pay for the road. This capital stroke of the Treasurer gave the state a double advantage in the sale of the road, and the successful floating of the second issue of 4 per cent. bonds at par."

"The company which has just secured the road is the same that negotiated for it on the 12th, and the parties to the negotiations yesterday were the same as were here before, with the exception of Mr. McGhee, who was prevented by sickness from being present yesterday. The purchasers are men of great capital, and of large and liberal views. There can be no doubt that they will at once proceed to complete the road to Atlanta in the best style possible."

Massachusetts Central.—There is a report current in Boston that negotiations have been concluded for a lease of this road to the Boston & Lowell Company, and for its completion as soon as possible. This lease, if made, will give the Lowell Company a line into Central Massachusetts and a connection with the West over the Hoosac Tunnel Line, in addition to the one that it now has over the northern roads and the Grand Trunk. The Lowell road has large terminal facilities in Boston, and could handle a larger business than it now does there, the only thing it needs, probably, being some additional elevator capacity. The lease might bring it a large increase of business, but would hardly swell the net earnings very much. On the other hand, it would probably affect considerably the business of the Fitchburg road, and to some extent that of the Boston & Albany also.

Later statements are that the agreement is not for a lease, but for exchange of traffic and for joint operation.

Metropolitan Elevated.—The new Second Avenue Line of this company in New York was opened for travel March 1, though the stations are not completed and temporary structures are used. The new line extends from Chatham Square through Division and Allen streets, First Avenue and Twenty-third street to Second Avenue and up that street to Sixty-fifth street. Trains upon it run down to the Battery, using from Chatham Square the line of the New York Elevated road.

Minneapolis & Lake Park.—This company has filed articles of incorporation in Minnesota and purposes to construct and operate a line of railroad and telegraph from a point within or near the city limits of Minneapolis to Minnetonka Lake Park, together with branches extending to other places of resort in that vicinity. The incorporators are John Creagh Hill of Cincinnati, O.; Albert L. Scott of Columbus, O., and Judson N. Cross, Samuel E. Neiler and Wm. McCrory, of Minneapolis.

Minneapolis & St. Louis.—The rock-cutting and other heavy work on the extension from White Bear to Taylor's Falls, Minn., have been let to Brackett, Rosser & Co., of Minneapolis. They will begin work as soon as men and tools can be brought together.

Nashville, Chattanooga & St. Louis.—At the special meeting in Nashville, Feb. 26, President Cole presented a long report showing the past management of the company, its recent acquisitions and its present position. He also stated that he could not retain the management under

the Louisville & Nashville control. The stockholders voted to authorize the sale of the St. Louis & Southeastern road; of the company's interest in the Evansville, Owensboro & Nashville and of all material bought for the extension of that road, such roads and property to be offered to the Louisville & Nashville Company, and, in case terms could not be agreed on with that company, than to any one willing to purchase. The President was also authorized to settle on equitable terms with subscribers to the issue of \$2,198,000 new bonds proposed to be made to build the new lines.

At a meeting of the directors, held Feb. 28, it was intended that four directors should resign and their places be filled by four of the Louisville & Nashville directors, but it was found that the latter were not legally qualified under the company's charter.

Nevada Northern.—This company has been organized to build a road from Battle Mountain, Nev., the junction of the Nevada Central and the Central Pacific, northwest to the north line of the state, near where Oregon and Idaho meet. The distance is about 120 miles.

Nevada Southern.—This company has been organized to build a railroad from Austin, Nev., terminus of the Nevada Central road, just completed, to Cloverdale, 80 miles, leading toward Columbus, Belleville and the Silver Peak mining district.

New Jersey Midland.—Under the order of the Chancellor giving 30 days to complete the re-organization, the Purchasing Committee give notice that holders of the first and second mortgage bonds can deposit them, with past-due coupons and funded interest certificates, with the Central Trust Company in New York until March 22, 1880, on payment of the assessment of 1 per cent. of the par value. After that date second mortgage bonds will be cut off from all rights under the re-organization, and first mortgage bonds will receive only their decree value, that is the *pro rata* share of the purchase money fixed by final decree of Court.

New York & New England.—This company has contracted for steel rails enough to lay the 30 miles of track from Brewsters, N. Y., to the Hudson River at Fishkill. Work is progressing rapidly on the line from Waterbury, Conn., to Brewsters.

New York Central & Hudson River.—The following brief but very satisfactory order was issued on Feb. 27 by President Vanderbilt:

"On the first day of March, 1880, the compensation of all officers and employees of the company will be restored to the rates paid prior to the reduction made on July 1, 1877."

The reduction then made varied from 10 to 15 per cent., according to the amount of the salary paid.

New York, New Haven & Hartford.—The board of directors has voted to reduce local fares over this company's lines 10 per cent., and for short distances 15 per cent. The reduction will be made about April 1. No change was made in through rates between Boston and New York.

New York, West Shore & Buffalo.—Several surveying parties are reported at work on the line of this projected road from Schenectady, N. Y., westward toward Buffalo. The line through Oneida County has been located and maps filed in the County Clerk's office.

Northern Central.—At the annual meeting in Baltimore, Feb. 26, resolutions were passed accepting and approving of the bill recently passed to adjust existing differences between the company and the state of Maryland in relation to taxation. It was also resolved that the annual report be hereafter printed in pamphlet form and distributed to stockholders one week before the annual meeting, instead of publishing it in the Baltimore papers, as heretofore.

Northern New York Pool.—A dispatch from Watertown, N. Y., March 2, says: "The Utica & Black River Railroad and the Rome, Watertown & Ogdensburg Railroad have entered a pool, and competition from this date will cease on freight and all western business. The Rome, Watertown & Ogdensburg Railroad will have full control of the western travel to and from Northern New York. By this arrangement, Watertown, Utica and Syracuse will be called upon to pay higher freight rates, and passenger rates to the River St. Lawrence will also be affected."

There has been an active competition between the two roads for some time past, which has been especially sharp since the Utica & Black River was extended to Ogdensburg.

Ohio & Mississippi.—In the United States Circuit Court, Feb. 25, Judge Drummond gave a decision on the demurrer to the cross-bill filed by the preferred stockholders, holding that, under the facts of the case, they are not entitled to the priority which they claim. The cross-bill was filed to establish a claim that the preferred stock was entitled to a lien prior to that of the second mortgage bonds, and subordinate only to the first mortgage. The Court now sets this claim aside, holding that the stock is preferred only as against the common stock, and has no claim to priority over any portion of the debt.

Oregon.—The Oregon Railway Company has filed articles of incorporation for a railroad from Portland across the Cascade Mountains to Goose Lake, with authority to extend the same to a connection with any other railroad extending to the east of the Rocky Mountains; also to build branch lines, and to acquire other roads by lease or purchase. The capital stock is \$2,000,000, with power to increase as needed.

Pennsylvania.—This company's statement for January shows for all lines east of Pittsburgh and Erie, as compared with January, 1879:

An increase in gross earnings of..... \$540,127
An increase in expenses of..... 193,360

Net increase..... \$346,767

All lines west of Pittsburgh show for the month a surplus of \$305,304 over all liabilities, being a gain of \$143,677 over January of last year.

For the lines east of Pittsburgh and Erie the increase in gross earnings is 21.2 per cent.; in expenses, 11.3 per cent., and in net earnings, 34.0 per cent.

It is said that the Hollidaysburg & Morrison's Cove Branch is to be extended from McKee's Gap, Pa., southward to a point on the Bedford Division near Bedford. The distance is about 25 miles. The extension would give the company a connection of its own with the Bedford Division, which can now only be reached from the main line over the Huntingdon & Broad Top road.

The contract for the masonry of the elevated line from West Philadelphia to the new depot on Broad street has been awarded to Miles King and Joseph N. Pattison. Work is to be begun as soon as the property on the line is vacated and the ground cleared.

There is a report current that the Standard Oil Company is busy getting proxies and buying stock, and that several changes in the board may be expected at the annual election.

Petersburg.—The stock (3,235 shares) of this company owned by the city of Petersburg, Va., has been sold for \$163,600 to a syndicate composed of Douglass Gordon, Thos.

C. Jenkins, B. F. Newcomer and Brown, Lowndes & Co., of Baltimore; Thomas Branch & Co., John Stewart, E. O. Nollings and W. H. Palmer, of Richmond, and Leverne Eyre, of Accomac County, Va.

Philadelphia & Reading.—This company's statement for January and the two months of its fiscal year from Dec. 1 to Jan. 31 is as follows:

	1880.	1879.	1880.	1879.
Gross receipts.....	\$1,239,177	\$900,483	\$2,564,957	\$1,711,373
Railroad traffic.....	\$2,284	\$2,580	29,227	7,777
Canal traffic.....	75,762	59,332	144,699	105,302
Steam coal.....	3,434	*20	19,793	14,359
Richmond barges.....				
Total R. R. Co.....	\$1,316,080	\$957,215	\$2,758,676	\$1,838,871
Coal & Iron Co.....	590,318	430,055	1,396,334	1,006,096
Total.....	\$1,906,407	\$1,387,270	\$4,155,010	\$2,845,567
Traffic:				
Passengers carried.....	763,413	532,858	1,489,916	1,008,462
Tons merchandise.....	490,460	292,391	927,006	500,509
Tons coal.....	484,117	451,698	1,137,306	824,867
Tons coal on colliers.....	45,504	34,361	90,092	78,263
By Coal & Iron Co.....	236,376	208,189	552,421	422,235
By tenants.....	69,143	84,387	180,727	142,073
Total.....	305,519	292,576	733,148	564,308

* Loss.

For the month the gross receipts of the railroad company show an increase of \$358,874, or 37.5 per cent., and of both companies again of \$519,137, or 37.4 per cent. For the two months the railroad company's receipts increased \$919,805, or 50.0 per cent., and those of both companies \$1,309,443 or 46.0 per cent.

A spur about two miles long is to be built from Hess' Station, Pa., on the Quarryville Branch, to reach some valuable iron mines lately leased by the company.

Piedmont & Potomac.—Surveys are being made for this road from Bloomington, Md., to Elk Garden, in Hampshire County, West Va., a distance of 12 miles. Contracts are to be let as soon as the line is located. It is intended hereafter to build beyond Elk Garden to the Fairfax Stone, 28 miles. The object of the road is to develop timber and coal lands.

Quebec & Lake St. John.—Surveys are being made for the extension of this road from its present terminus at Gosford, 25 miles from Quebec, through the wilderness to Lake St. John. Two lines are to be run; one by the Metabetchouan Valley, the other by the River Batiscan.

St. Johns & Lake Eustis.—This road is now completed from the St. Johns River, at Astor, Fla., southwest to Fort Mason, on Lake Eustis, a distance of 26 miles. The company owns a steamboat running on the lake from Fort Mason to Griffin, and to Leesburg, on Lake Harris. At Astor connections are made with steamboats on the St. Johns. The road is said to be chiefly owned by Mr. Wm. Astor, of New York, who has a large amount of land on its line.

St. Louis, Iron Mountain & Southern.—The agreement under which the stock of this company is held in trust will probably be terminated soon, as the company is now able to pay interest on its income bonds, and the bondholders are uniting in a request to the trustees to terminate the trust.

St. Paul & Sioux City.—In St. Paul, Minn., March 3, the consolidation with the St. Paul, Stillwater & Taylor's Falls and the Hudson & River Falls companies was completed and the final papers passed.

Securities on the New York Stock Exchange.—The following securities have been placed on the lists at the New York Stock Exchange:

Albany & Chesapeake Canal.—Bonds bearing 7 per cent interest, amount \$500,000.

Metropolitan Elevated.—New first mortgage bonds, \$2,500,000, making total issue \$8,500,000.

North Wisconsin.—Capital stock, \$900,000; first mortgage bonds, \$800,000, of which \$600,000 are now outstanding, and the balance will be issued about April 1.

St. Paul & Duluth.—Common stock, \$4,055,400; preferred stock, \$4,823,800. There is no bonded debt.

Texas & Pacific.—Capital stock, authorized amount, \$50,000,000, of which there is now outstanding \$7,706,000; a further issue of \$1,700,000 is to be made next month to redeem certificates representing accrued interest on income and land-grant bonds, and the balance is to be issued at the rate of \$30,000 per mile of the 600 miles now under contract.

Summit County.—This road, which is now in operation from Echo, Utah, on the Union Pacific to Coalville, 7½ miles, is to be extended some 25 miles further, to Park City, to reach the silver mines at that place. The road is controlled by the Union Pacific.

Telegraph War.—A contest of large proportions and probably long duration was begun this week, the new American Union Telegraph Company and its supporters being the assailants, and the Western Union the attacked party. The first move was the seizure, without notice, by the Baltimore & Ohio of all the wires over its lines, which had been worked by the Atlantic & Pacific Company, and in close connection with Western Union. This was followed by the seizure of the wires over the Union and Kansas Pacific lines, the company taking possession and notifying the Western Union to remove certain wires owned by it. All the seized wires were turned over to the American Union, or at least placed at its disposal. The Western Union was taken by surprise at first, but acted as promptly as possible. A temporary injunction was obtained in time to save its wires on the Missouri Pacific and Central Branch roads, and an application for an injunction against the Union Pacific, to be argued shortly. No action has been taken as to the Baltimore & Ohio wires.

Texas & St. Louis.—The track on this road is now laid to Mt. Pleasant, Tex., 61 miles west by south from Texarkana, and 31 miles beyond the late terminus at Sulphur Fork. Work is in progress on the 46 miles from Mt. Pleasant to Big Sandy, whence the company has 21 miles in operation to Tyler.

Texas Trunk.—This company has let a contract for grading a section of 20 miles from Dallas, Tex., southeast. The projected line is from Dallas to Sabine Pass.

Union Pacific.—Surveys have been begun for a line from Cheyenne, Wyo., to the Yellowstone country, with a branch to the Black Hills. It is said that the company means to build this year from Cheyenne to the North Platte, about 125 miles.

Wabash, St. Louis & Pacific.—The following important matters are to be submitted to the stockholders at a special meeting early in May next:

1. An agreement with holders of bonds and stock of the Toledo, Peoria & Western Railroad Company for the issue of 29,000 shares of the preferred stock and 20,000 shares of the

common stock of the Wabash, St. Louis & Pacific Railway Company, in exchange for the first and second preferred income bonds and common stock of the Toledo, Peoria & Western Railroad Company, upon terms specified in the agreement, which has been published in substance.

2. An agreement for the consolidation of the Chicago & Paducah and the Chicago & Strawn railroad companies with the Wabash Company upon the terms of one issue of \$4,500,000 5 per cent. bonds, secured by a mortgage on the two first-named roads.

3. A resolution of the board of directors of the Wabash, St. Louis & Pacific for the creation of a consolidated mortgage not to exceed \$50,000,000.

4. Also to consider the proposed action of the company in purchasing steam barges for use on Lake Erie, at a cost not exceeding \$500,000, and the investment by the company of a sum not exceeding \$200,000 in providing facilities for moving grain upon the Mississippi River by subscribing to the capital stock of a corporation organized for that purpose.

This company has now under contract seven large propellers, which are to run between Toledo and eastern lake ports. The line will be started this spring.

In the investigation of the St. Charles bridge accident last November, the coroner's jury has found that the fall of the bridge was caused by the derailment of some cars of the freight train which was on it when it fell. The jury further censures the company for the condition of the bridge floor at the time of the accident.

Wisconsin & Minnesota.—This company has been organized in the interest of the Wisconsin Central to construct a railroad from Colby, a station 216 miles from Milwaukee, and about 16 miles north of the point where the line turns from a westerly to a northerly course, westward 53 miles to Chippewa Falls, on the Chippewa Falls & Western road, which will connect it with the Chicago, St. Paul & Minneapolis, while the latter will connect it with St. Paul, and give an outlet to the west and southwest for the lumber, which forms the chief freight of the Wisconsin Central. The line is spoken of also as a route for wheat, etc., from St. Paul to Milwaukee. It would be 377 miles long, against 324 by the Chicago, Milwaukee & St. Paul. It would not be for the interest of the Chicago, St. Paul & Minneapolis to cultivate traffic to and from Lake Michigan by this route, as it would get a haul of but 88 miles out of it, against 197 on traffic done in connection with the Chicago & Northwestern; but it would possibly be glad to get the Wisconsin Central lumber.

ANNUAL REPORTS.

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Chicago & Alton.

At the close of its seventeenth fiscal year, Dec. 31, 1879, this company worked the following lines:

	Main line.	Second line.	Sidings.	Total track.
Chicago to Joliet (leased).....	37.20	36.48	16.84	90.52
Joliet to East St. Louis (owned).....	243.50	25.58	57.17	326.25
Coal City Branch (owned).....	27.84		5.74	33.58
Dwight to Washington, and Branch to Lacon (owned).....	79.80		7.18	86.98
Roodhouse to Louisiana (owned).....	38.10		5.29	43.39
St. Louis, Jacksonville & Chicago (leased).....	150.60		13.63	164.23
Louisiana & Missouri River (leased).....	100.80		10.44	111.24
Mexico to Kansas City (leased).....	102.62		21.59	124.21
Total miles.....	840.46	62.06	137.88	1,040.40

The Kansas City, St. Louis & Chicago road, from Mexico to Kansas City, was completed and added to the lines worked during the year; it was in operation somewhat more than half the year. During the year the Chicago & Illinois River road, 23.86 miles, previously leased, was bought at foreclosure sale; it is included above in Coal City Branch. The increase in mileage was 162.62 miles main track and 27.67 miles of sidings, 190.29 miles of track in all.

The equipment consists of 187 locomotives; 95 passenger-train cars; 2,364 box, 151 combination, 702 stock, 885 platform and coal, 10 dump coal, 23 drovers' and 83 caboose cars. There are also 12 Pullman cars in use on the road. Of the locomotives, 65 are equipped with the Westinghouse automatic brake, 1 with the Eames vacuum brake, and one with the Card steam brake. There were added during the year 27 locomotives; 5 passenger, 3 postal and 937 freight cars.

The general account, somewhat condensed, is as follows:

Preferred stock.....	\$2,425,400.00
Common stock.....	10,065,400.00
Old common stock scrip.....	72.00
Total (\$32,090 per mile owned).....	\$12,490,872.00
Funded debt (\$39,873 per mile).....	11,627,850.00
Sinking fund bonds paid and canceled.....	600,000.00
Bonds, stocks, etc., unissued.....	47,813.39
Louisiana & Missouri River, special bond account.....	439,100.00
Sundry accounts, current balances, etc.....	550,307.50
Kansas City, St. L. & Chi. construction fund unexpended.....	828,020.90
Income account, credit balance.....	579,373.22
Rentals accrued, not yet due.....	142,741.67

Total.....	\$27,296,078.77
Construction accounts.....	\$22,291,572.88
Cash and bonds with various trustees.....	101,561.50
Stocks, Bonds, etc., owned.....	651,100.00
Kan. City, St. L. & Chi. bonds in trust.....	3,000,000.00
La. & Mo. River second mortgage bonds.....	70,000.00
La. & Mo. River advances to pay interest.....	361,539.79
Cash and balances due.....	820,304.60
Total.....	27,296,078.77

The bonded debt consists of \$2,400,000 first mortgage bonds; \$1,096,000 income bonds; \$4,379,850 consolidated sterling bonds; \$3,000,000 sinking fund bonds secured by an equal amount of Kansas City, St. Louis & Chicago bonds; \$564,000 St. Louis, Jacksonville & Chicago first, and \$188,000 second mortgage bonds assumed. The stock remains

unchanged; the debt was increased by the \$3,000,000 new bonds for the Kansas City line.

The traffic for the year was as follows:

	1879.	1878.	Inc. or Dec.	P. c.
Passengers carried	843,429	781,991	I.	61,438 7.9
Passenger mileage	54,219,073	37,797,542	I.	16,421,531 43.4
Tons freight carried	2,634,177	1,967,306	I.	666,871 33.9
Tonnage mileage	402,234,396	248,286,318	I.	153,948,078 62.0
Av. receipt:				
Per pass. per mile	2.419 cts.	2.834 cts.	D.	0.415 ct. 14.6
Per ton per mile	1.054 "	1.298 "	D.	0.244 " 18.8

The number of pieces of baggage checked was 330,845, an increase of 60,939 during the year.

The average rate per mile was 1.957 cents on through, 2.633 cents on local, and 3 cents on mileage-ticket passengers. Local passengers were 94.4 per cent. of the whole number carried.

Local freight furnished 76.36 per cent. of the tons carried. The tonnage of coal was 817,301, against 646,698 tons in 1878, an increase of 26.4 per cent.

Through freight showed a greater relative increase than local, which partly accounts for the decrease in the average rates. The increase in through business is due to the opening of the Kansas City line.

The business to and from the three terminal points is shown as follows:

	1879.	1878.	Inc. or Dec.	P. c.
Carried to Chicago	78,862	60,672	I.	17,190 28.2
Carried from Chicago	91,789	85,424	I.	6,365 7.4
Carried to St. Louis and East St. Louis	78,860	65,571	I.	13,289 20.3
Carried from St. Louis and East St. Louis	75,901	66,219	I.	9,682 14.6
Carried to Kansas City	27,041	20,495	I.	6,546 31.9
Carried from Kansas City	37,388	135,508	I.	98,120 72.4

It will be noticed that many more passengers were carried from than to Chicago, while more went to St. Louis than left it. It is to be hoped that envious St. Louis people will not draw the inference that people consider Chicago an excellent place to leave.

Leading items of freight were 5,919,401 bushels wheat; 9,623,131 bushels corn; 2,544,042 bushels other grain; 948,022 barrels flour; 200,614 cattle; 676,551 hogs; 59,819 sheep; 15,932 horses; 111,587,720 feet lumber; 817,351 tons coal; 180,268 tons iron. Corn showed a slight and oats a large decrease; all other items of freight an increase.

Some statistics of train movement were as follows:

	1879.	1878.	Inc. or Dec.	P. c.
Train mileage	1,113,791	909,761	I.	204,030 22.4
Passenger	2,405,847	1,799,645	I.	606,202 33.7
Freight	3,609,638	2,700,406	I.	909,232 33.6

Total revenue miles. 3,609,638 I. 909,232 33.2
Car mileage: 4,772,256 3,436,271 I. 1,335,985 38.8
Freight train mileage 62,068,937 39,522,338 I. 22,546,599 57.1

Av. train load: 48.68 41.55 I. 7.13 17.2
Passengers, number 161.00 138.00 I. 23.00 16.7
Freight, tons 130.00 cts. 139.00 cts. D. 9.00 cts. 6.5

Earnings per train mile: 170.00 cts. 170.00 cts. D. 0.00 cts. 0.0
Passenger trains 170.00 cts. 170.00 cts. D. 0.00 cts. 0.0
Freight trains 170.00 cts. 170.00 cts. D. 0.00 cts. 0.0

Average, all trains 159.45 172.42 D. 12.97 " 8.1
Net " 75.00 " 79.50 D. 4.50 " 5.8

Of the freight-car mileage last year 74.461 per cent. was of loaded cars. Average tonnage to each loaded car was 10,256 tons; to each car, loaded and empty, 7,637 tons. Foreign freight-cars ran 18,795,959 miles on this road, and Chicago & Alton cars ran 10,808,796 miles on foreign roads. Passenger-train cars ran 60,714 miles on foreign roads.

Cost of motive power per revenue train mile was 25.33 cents, an increase of 0.63 cent over the previous year.

The earnings for the year were as follows:

	1879.	1878.	Inc. or Dec.	P. c.
Passengers	\$1,311,708.17	\$1,071,103.68	I.	\$240,604.49 22.5
Freight	4,242,791.30	3,469,509.82	I.	773,281.48 22.4
Express	111,806.00	97,969.00	I.	13,837.00 14.1
Mails	88,530.24	92,146.84	D.	3,616.60 39.7
Miscellaneous	840.70	789.79	I.	50.91 6.4
Total	\$5,755,677.19	\$4,671,519.13	I.	\$1,084,158.06 23.2
Expenses	3,049,520.63	2,515,134.31	I.	534,386.32 21.2
Net earnings	\$2,706,156.56	\$2,156,384.82	I.	\$549,771.74 25.5
Gross earnings per mile	7,313.44	6,891.77	I.	421.67 6.1
Expenses	3,874.87	3,710.51	I.	164.36 4.4
Net earnings	3,438.57	3,181.26	I.	257.31 8.1
Percent. of expenses	52.98	53.83	D.	0.85 1.6

If the net earnings of the Kansas City, St. Louis & Chicago road to Nov. 1, which were credited to construction as by agreement, be deducted, the net earnings still show an increase of 20.75 per cent. The net earnings per mile show a considerable gain, in spite of the large mileage of new road. The average increase in mileage for the year was 109 miles.

No pay has been received for carrying the mails between Mexico and Kansas City, the rate of pay not having been settled. All improvements and betterments of road are included in the expenses. Of the whole amount of expenses, 64.42 per cent. was for labor and personal services, 35 per cent. for supplies and materials, and 0.58 per cent. for miscellaneous expenses.

The income account was as follows:

Gross receipts from traffic, including Miss. River Bridge	\$5,755,677.19
Dividends and interest on Miss. River Bridge stock and bonds held	33,000.00
Balance of amount temporarily taken from this account to buy supplies	350,000.00
Total	\$6,138,677.19
Debit balance, Dec. 31, 1878	\$109,442.06
Interest on funded debt	561,278.85
" La. & Mo. River bonds	30,737.00
Rent, St. L., Jacksonville & Chi. R. R.	297,293.24
" Joliet & Chicago	131,980.00
" Louisiana & Mo. River	138,370.00
" Mississippi River Bridge	63,000.00
" Kan. City, St. L. & Chicago, two months	52,500.00
Rent, Chi. & Ill. River, before purchase	71,709.41
Two dividends, March 1 and Sept. 1	765,776.00
Taxes of former years	155,961.75
Interest and exchange	14,236.50
Stock of Joliet Iron & Steel Co.	15,273.38
Net earnings, K. C., St. L. & Chi. to Nov. 1, credited construction	102,175.15
Working expenses for the year	3,049,520.63
Total	\$5,559,303.97
Credit balance, Dec. 31, 1879	\$579,373.22

The taxes of former years were amounts for 1873, 1875, 1876, 1877 and 1878, which have been in litigation. All back taxes have now been paid except those perpetually enjoined by the courts.

The earnings from traffic, after deducting expenses, interest, rentals and all sums properly chargeable to income, were equal to 9.42 per cent. upon the whole capital stock.

Of the 840.46 miles of main track, 602.08 miles are now laid with steel and 238.38 with iron; of the 62.06 miles second track, 53.48 miles are steel and 8.58 iron. There were 206.15 miles of track laid with steel in 1879, of which 162.62 miles were on the new Kansas City line, and 43.53 miles in renewals on the older lines.

The Joliet & Chicago is held under perpetual lease at 7 per cent. on \$1,500,000 stock and \$300,000 bonds; it is part of the main line and no separate account of its earnings is kept.

The Chicago & Illinois River road, before leased, was bought at foreclosure sale in September. It is parallel to the main line, reaching a large coal district, and can, by building a short connection, be made to serve as a loop or second line for 28 miles. Deducting estimated value of 1,400 acres of coal land included in the purchase, its cost has been \$15,500 per mile; should a claim now pending in court be allowed, its cost will be increased to \$19,800 per mile, very much less than its value.

The St. Louis, Jacksonville & Chicago earned \$742,758.10, an increase of 13.27 per cent. The Louisiana & Missouri River earned \$317,758.59, an increase of 37.32 per cent.

The Kansas City, St. Louis & Chicago road has cost, charging all interest up to Nov. 1, 1879, and all discount, and crediting all net earnings up to the same time, \$3,957,382.27, or \$24,335.15 per mile. The actual construction expenditures were \$3,592,027.95, or \$22,088.47 per mile. But of this the steel bridge over the Missouri cost \$475,341.96; if this is deducted the rest of the road cost but \$19,165.33 per mile. It is estimated that at present prices it would cost at least \$1,500,000 more. The cost exceeded original estimates, because a better road was built than was at first intended. Masonry culverts and iron bridges were used instead of wood, stone ballast used, larger station grounds bought in Kansas City, and the whole work made of the most substantial kind. The company issued \$1,750,000 preferred stock and \$3,000,000 bonds to the lessee. The road has done better than expected, and though fully worked only one-half of the year, it contributed 56½ per cent. of the increase in gross earnings.

The report says: "The present traffic of our lines imperatively demands additional tracks and buildings at Chicago and East St. Louis, about 15 miles of new side tracks at other stations on our several lines east of Mexico, and a large addition to our rolling stock. Partial provision has already been made to meet this demand."

"Twenty locomotives have been contracted for delivery within the next three months, and an average of about eight freight cars per day are being constructed at the shops of our company at Bloomington."

"When authority was last conferred upon the board to increase the share capital of our company, the additional amount was limited to \$2,710 shares. As was proposed at the time, only about one-half of that number was issued. By the terms of the circular, to which the shareholders gave their consent, it was provided that the time when the remainder of the shares should be issued and sold should be left to the future decision of the board, in view of the necessities of the traffic of the lines as the same might be thereafter developed."

"The shares then issued were sold to the shareholders *pro rata* at par, in the proportion of one share to each 10 shares owned by them respectively, less fractions, if any. In our opinion, a similar issue and sale should be made not later than May next, of which at least thirty days' notice will be hereafter given. Such an issue of shares would provide a fund of about \$1,000,000, which is no more, in our judgment, than will be needed to procure facilities for the increased traffic of our lines in the immediate future."

"The property of our company has been in all departments fully maintained in efficient condition, and in many respects improved, during the last year."

"The acknowledgements of the board are due to the officers in charge of the several departments, and those employed under their direction, for efficiency, zeal and fidelity manifested in the discharge of their duties during the past year."

Lehigh Valley.

This company owns a line from Easton, Pa., northwest to Wilkesbarre, 101 miles, with branches from Penn Haven to Audenreid, 18.5 miles; Black Creek Junction to Mt. Carmel, 30.5 miles, and a network of shorter coal branches; the Easton & Amboy, from Easton to tide-water at Perth Amboy, N. J., 60 miles. The statement of track owned at the close of the last two fiscal years is as follows:

	1879.	1878.
Main line and branches, main track	293.40	293.25
Second track used as such	159.00	151.63
Second track used as sidings	17.80	18.02
Sidings	187.37	176.38
Total	657.57	639.88

The company also owns the Pennsylvania & New York and the Geneva, Ithaca & Sayre roads, which are not included above, or in the report. It also owns a large coal property.

In addition to the above mileage there are 6.26 miles graded ready for second track. The company has 440.1 miles of telegraph wire, of which 216.9 miles are on its own poles.

The equipment consists of 238 engines; 71 passenger and 36 baggage cars; 1,088 box, 13 stock, 18 back, 536 platform, 450 gondola, 44 lime, 100 tunnel coal, 24,461 coal and 66 caboose cars; 1 pay, 26 wreck and tool and 166 gravel cars. Additions during the year were 3 engines, 38 box, 1 stock, 18 back, 2 platform and 141 gondola cars.

The report of Mr. Charles Hartshorne, Vice-President and Acting President for the fiscal year ending Nov. 30, 1879, says: "The price of coal during 1879 was unprecedentedly low, and our business was restricted during the first four months of our fiscal year by our unwillingness to put coal into market in such quantities and at such rates as would not return cost to the producers. After some months' trial, it became evident, however, that other companies were supplying the demand, to the prejudice of our operators, and our rates to tide were reduced, so as to be equal to those charged by our competitors."

"The total coal tonnage was as follows: Anthracite, 4,361,785; bituminous, 53,499; making 4,415,284 tons, being an increase of 935,691 tons over 1878, and of 23,998 tons over 1877, heretofore our year of heaviest coal tonnage. Of this, 1,536,476 tons were carried over the New Jersey Division, against 879,377 tons in 1875."

The capital account at the close of the year was as follows:

Preferred stock	\$106,300.00
Common stock, including scrip not converted	27,322,555.00
Total	\$27,428,855.00
Six per cent. bonds of 1898	\$5,000,000
Seven per cent. bonds of 1910	6,000,000
Consolidated mortgage bonds	14,437,000
Floating debt, less cash on hand	25,437,000.00
Total	\$53,213,214.72

During the year the capital was increased by \$200,000 stock and \$929,000 consolidated bonds. There were \$133,000 bonds drawn for redemption just at the close of the year. The total receipts were as follows:

Income from all sources \$6,540,363.74 1879. 1878. \$6,186,021.61 I. \$354,342.13 5.7

Working expenses of the road 2,996,981.28 2,456,926.63 I. 540,054.65 22.0

Net income \$3,543,382.46 1879. 1878. \$3,729,094.98 I. \$185,712.52 5.0

Net income for the year \$3,543,382.46 1879. 1878. \$3,729,094.98 I. \$185,712.52 5.0

Interest on bonds \$1,557,900.00 1879. 1878. \$1,557,900.00 I. \$0.00 0.0

Dividends, 10 per cent. on preferred and 4 per cent. on common stock 1,095,523.50 1879. 1878. \$1,095,523.50 I. \$0.00 0.0

General expenses, interest, taxes, loss on coal and on Morris Canal 866,595.66 1879. 1878. \$866,595.66 I. \$0.00 0.0

Balance to credit of profit and loss \$23,363.30 1879. 1878. \$23,363.30 I. \$0.00 0.0

This is the first of the coal roads which are reported so far which does not show a loss for 1879. That the company could show a surplus of \$1,118,886.80, enough to pay a moderate dividend, is doubtless due to its more conservative policy and to the large business of the road outside of its coal interests.

The report refers at length to the death of the late Asa Packer, his long connection with and services to the company; also to the death of Mr. W. W. Longstreth, for many years a director.

The report of Superintendent and Engineer Robert H. Sayre gives the coal tonnage as above. In the table of distribution of coal tonnage the chief items are as follows: Shipped east over New Jersey Division, 1,536,476 tons; to Belvidere Division, Pennsylvania Railroad, 749,064; north over Pennsylvania & New York road, 506,723; east by Morris Canal, 211,671; to North Pennsylvania road, 207,109; to furnaces and manufacturing companies on the line, 592,884 tons.

The total traffic was as follows:

	1879.	1878.	Increase.	P. c.
Passenger mileage	15,082,971	112,557,960	37,982,630	33.8
Freight tonnage mileage	150,540,605	112,557,960	37,982,630	33.8
Coal tonnage mileage	124,194,516	96,607,302	27,587,214	28.6
Above Mauch Chunk	242,435,710	166,143,330	76,292,380	45.9
Below Mauch Chunk	306,630,226	262,751,632	103,878,594	39.5

The rate per ton per mile on general freight was 0.99 cent, a decrease of 14.65 per cent. from 1878. The rate per ton per mile on coal was 24.5 per cent. less than in the previous year. The Western business to Philadelphia has largely increased and its growth is only retarded by the failure of connecting lines to furnish proper facilities for handling in that city.

The earnings of the road were as follows:

	Earnings.	Expenses.	Net earnings.
From transportation of			
Coal	\$4,011,444.50	\$1,853,673.40	\$2,157,771.10
General freight	1,488,578.38	850,908.59	637,669.79
Passengers, express and mails	432,302.77	283,309.20	148,993.57
Total	\$5,932,325.65	\$2,987,891.28	\$2,944,434.37
Total, 1878	5,532,738.11	2,456,926.63	3,075,811.48
Increase	\$399,587.54	\$530,964.65	\$140,407.11
Decrease	7.22	21.98	4.57

The expenses were 50.52 per cent. of gross receipts against 44.41 per cent. in 1878. The increased proportion was due partly to heavy renewals, but more to the low rates obtained both on coal and general freights. The proportion is likely to increase still more, on account of greater wages for labor, which must be paid, and the general rise in prices of all sorts of supplies.

Four new iron bridges have been built, making all the bridges on the main line iron, except Penn Haven bridge.

Several new station-houses and a water-station have been built, and work begun on a large round-house at South Easton.

There were 34.28 miles of track laid with steel rails during the year, making 339.46 miles now laid with steel. Some of the first steel rails laid in 1864 have begun to wear out and have been taken up and used in sidings. The rails heretofore referred to, at Packerton Scales, are still in good condition, after having a tonnage of 45,746,798 tons over them.

A number of new sidings and spurs have been laid, and grading for more second track done.

In telegraph, the company owns 440 miles of wire, of which 217 miles is on the old road, 168 miles on Western Union poles and 55 miles on North Pennsylvania poles.

A freight pier, 936 by 75 feet, was built at Perth Amboy and the slips there dredged out. There is need of better water supply there.

Work was to be begun a short time since on the improvement and shortening of the line between Penn Haven and Black Creek Junction. More shop-room and tools are needed. It would also help very much in economy of working, if a better line over the Wilkesbarre Mountain could be secured; this improvement is more needed every year, as the bulk of south-bound business increases.

Pennsylvania Railroad.

The report of President Scott for this company's 32d year differs slightly from those which precede it, in that the statistics given are generally in more condensed form, the details being left for the reports of the Comptroller, General Manager and other officers (not yet published) to furnish. The report covers the operations of all the lines worked directly, which are as follows:

1. The Pennsylvania Railroad Division, including the main line from Philadelphia to Pittsburgh, 358 miles, with 734.5 miles of branches, owned or leased, making 1,092.5 miles in all.

2. The United Railroads of New Jersey Division, including the main line from Jersey City to Philadelphia, 89 miles, and 336.5 miles of branches, owned or leased; also the Delaware & Raritan Canal and branch, 66 miles, making in all 425.5 miles of railroad and 66 of canal.

3. The Philadelphia & Erie Division, a main line from Sunbury, Pa., to Erie, 288 miles.

Changes during the year are an increase of 37.5 miles in branches of the Pennsylvania Railroad Division; an increase of 52.5 miles in the United New Jersey branches, caused by the lease of the Freehold & Jamesburg road, before controlled, and the purchase at foreclosure of the Pemberton & New York road.

The total of all lines worked directly is thus 1,806 miles of railroad and 66 of canal, whereof the earnings were as follows:

	1879.	1878.	Inc. or Dec.	P. c.
Gross earnings	\$21,743,629	\$20,317,140	I.	\$1,426,489 7.0
Expenses	11,751,621	10,921,103	I.	830,518 7.6
Net earnings	\$9,992,008	\$9,396,037	I.	\$595,971 6.3
Gross earn. per mile	19,903	19,258	I.	645 3.3
Net " "	9,146	8,906	I.	240 2.7
Per cent. of exps.	54.05	53.75	I.	0.30 0.6

II. UNITED NEW JERSEY DIVISION.				
Gross earnings.....	\$9,784,843	\$8,398,534	I.	\$1,386,309 16.5
Expenses.....	6,500,862	5,502,942	I.	997,920 18.1
Net earnings.....	\$3,283,981	\$2,895,592	I.	388,389 13.4
Gross earn. per mile.	19,908	19,131	I.	777 4.1
Net " " "	6,882	6,506	I.	86 1.3
Per cent. of exps....	66.44	65.50	I.	0.94 1.4

III. PHILADELPHIA & ERIE DIVISION.				
Gross earnings.....	\$3,091,808	\$2,921,061	I.	\$170,747 5.8
Expenses.....	2,130,258	2,044,949	I.	85,309 4.2
Net earnings.....	\$961,550	\$876,112	I.	\$85,438 9.8
Gross earn. per mile.	10,735	10,143	I.	592 5.8
Net " " "	3,339	3,042	I.	297 9.8
Per cent. of exps....	68.90	70.00	D.	1.10 1.6

A summary of the general income account is as follows:

Net earnings Pennsylvania Railroad Division, as above.....	\$9,992,007.76
Interest from investments, equipment, etc.....	2,513,198.21
Total.....	\$12,505,205.97
Interest on bonded debt and lease charges on branches.....	5,022,725.49
Net balance.....	\$7,482,480.48
United New Jersey, net earnings.....	\$3,283,981.52
Interest received in cash from investments.....	211,239.54
Total.....	\$3,495,221.06
Dividends, interest and other charges.....	4,306,073.03
Interest on Belvidere Delaware equipment.....	39,037.12
Total charges.....	\$4,435,110.15
Net loss on United New Jersey lines.....	939,889.09
Balance.....	\$6,542,591.39
Philadelphia & Erie net earnings.....	\$961,549.74
Interest charged on equipment.....	163,049.04
Net balance.....	\$798,500.70
Paid Philadelphia & Erie Co. as rental.....	798,500.70
Net balance from lines directly worked.....	\$6,542,591.39
Advances to companies west of Pittsburgh.....	\$802,780.41
Payments to Trust Fund.....	600,000.00
Payments to consol. mortgage sinking fund.....	243,400.00
Balance after deducting all charges.....	\$4,896,350.98
Dividends paid, 4½ per cent.....	3,069,159.00
Balance to profit and loss.....	\$1,797,191.98

This balance was equivalent to a little over 2½ per cent. additional on the stock. The loss on the United New Jersey lease showed a decrease of \$196,886.07 from the previous year. The advances to controlled companies were \$63,845.46 less than in 1878.

The profit and loss account is as follows:

Balance to credit, Dec. 31, 1878.....	\$4,057,815.14
Balance of income, as above.....	1,797,191.98
Amount realized from old accounts.....	122,840.18
Total.....	\$5,977,847.30
Consolidated bonds redeemed in 1878.....	\$100,000.00
Paid to fund for purchase of guaranteed securities in 1878.....	100,000.00
Reduction in value of securities, etc.....	1,596,773.97
Balance to credit, Dec. 31, 1879.....	\$4,181,073.33

The report says: "The amount expended for construction, equipment and real estate during the year was \$1,258,778.24. "The principal items of construction expenditure upon the Main Line were as follows, viz.: The change of line at Valley Creek, the purchase of right of way at different points on the Philadelphia and Pittsburgh divisions, the erection of the Seventh Avenue and Hospital Bridges at Pittsburgh, in pursuance of the contract entered into with that city several years since, the work upon the new branch from Frazer to West Chester, and additional terminal facilities at Philadelphia. The latter included the construction of the line hereinafter referred to, from Market street to a connection with the Delaware Extension, the additional piers on the Navy Yard property, and the preliminary work upon the elevated line on Filbert street, including the bridge across the Schuylkill River.

"The work upon the extension of the Pittsburgh, Virginia & Charleston Railway to Brownsville, a distance of 23 miles, is being prosecuted steadily, and the entire line is now nearly ready for the rails. Your board, with a view to providing funds for this work, authorized a traffic indorsement to be placed upon \$400,000 of the bonds of that company, under which your company agree, together with the Pittsburgh, Virginia & Charleston road, to receive the same in payment of 20 per cent. of all freight charges accruing upon joint traffic passing to or from that road and your line. As these bonds bear 6 per cent. interest, and their redemption at par is assured by the traffic agreement referred to, it is believed that they are an excellent security, and will be absorbed for regular investment. In order to simplify the operation of that railway, it has been leased to your company at cost, and is now operated as a branch of the Pennsylvania Railroad Division.

"Upon the New Jersey Division the largest expenditure was in connection with the building of an elevator and other improvements at Harsimus Cove. The Cortlandt Street Ferry House and slips at New York were also enlarged and entirely rebuilt, and the west approach to the New Brunswick bridge completed. The steamboats and car floats, used in connection with the transfer of freight between Jersey City and New York, which had belonged to other parties, were purchased by your company during the past year, and the cost thereof, \$160,000, charged against the equipment account of the New Jersey Division.

"The construction expenditure upon the Philadelphia & Erie Division represents the cost of sidings and second track at various points upon that line.

"The amount charged to real estate was expended mainly in the purchase of property in connection with the Filbert Street Extension in Philadelphia.

"The outlay upon the branch roads consisted principally of expenditures upon the West Chester Road, and upon branch lines connected with the Southwestern Pennsylvania Railway.

"There will probably be expended upon construction, equipment and real estate during 1880 the sum of four and a half millions of dollars. This will represent:

"First. The estimated outlay upon the Filbert Street Extension, \$2,500,000, of which \$1,000,000 can no doubt be provided through mortgages upon the real estate purchased in connection therewith.

"Second. The cost of straightening the Main Line east of Downingtown, completing the Schuylkill Front Line, the Navy-yard piers at Philadelphia, and the Hospital Bridge at Pittsburgh, \$375,000;

"Third. The cost of completing the elevator and other

improvements at Harsimus, Jersey City, \$475,000, for which your company will receive, under the terms of the lease, capital stock of the United Railroads of New Jersey;

"Fourth. The cost of new tracks, stations, and right of way upon our Main Line and New Jersey Division and branches, \$775,000; and

"Fifth. The cost of additional passenger equipment, etc., \$375,000.

"The funds required to meet these expenditures beyond the amounts to be realized, as aforesaid, can no doubt be provided out of assets in your treasury.

"The debt due the state of Pennsylvania on account of the purchase of the Main Line was reduced during the year by the payment of \$246,147.68, which was charged to capital account. The balance of the \$460,000, representing the interest upon the amount due for 1879 to the state, was charged directly to income account.

"The bills payable of the company at the close of the year amounted to \$1,040,000, but have since been reduced to \$440,000. By reference to the Treasurer's account, it will be found that the cash balance on hand exceeded the whole amount of floating debt appearing therein.

"Under the provisions of the consolidated mortgage of the company there was set apart on the first day of July last, out of the net income, the sum required for the purchase of outstanding bonds secured by that mortgage, and entitled to the security of the covenants therein in relation to a sinking fund. Bonds of the par value of \$243,460 were thus purchased, and after being canceled, were delivered to the trustees under the stipulations of said mortgage. This reduction appears in the Treasurer's general account.

"In order to provide for the payment at maturity on Dec. 31, 1880, and the cancellation of \$4,970,000 of the first mortgage bonds of the company, the board of directors have caused to be issued \$5,000,000 of 5 per cent. bonds, due in forty years, secured by the consolidated mortgage of the company. These bonds were disposed of on favorable terms to Messrs. Drexel & Co., and will be delivered to them during the current year. The board have also had under consideration the necessary provision for the payment at maturity, or extension at a reduced rate of interest, of the bonds for \$1,000,000, bearing 6 per cent. interest, maturing Jan. 1, 1881, secured by mortgage upon the Navy-yard property at Philadelphia.

"It is presumed the Philadelphia & Erie Railroad Company will take the needful steps to provide for the payment, or extension at a lower rate of interest, of its bonds for \$5,000,000 maturing March 30, 1881.

"There are now in the sinking fund for the redemption of the obligations of the various companies forming the United New Jersey Railroad & Canal Company, bonds of the par value of \$1,809,000. Your company has also redeemed during the year an additional amount of \$124,000, making an aggregate investment of \$1,433,000, for which you will in the future, in accordance with the terms of the lease, receive bonds issued under the general mortgage of that company.

"During the past year the Bald Eagle Valley Railroad Company, in which your company is largely interested as a shareholder, as well as lessee, created a first mortgage securing bonds to the amount of \$400,000, bearing 6 per cent. interest, maturing in 1910, for the purpose of providing for \$300,000 of mortgage bonds maturing July 1, 1881, and \$100,000 of mortgage bonds bearing 7 per cent. interest, due July 1, 1884, the latter of which were owned by your company. An agreement was entered into by which, in consideration of an equitable allowance to be paid by the Bald Eagle Valley Railroad Company, your company exchanged the bonds so held by it for the new 6 per cent. bonds referred to, and offered to the holders of the remaining outstanding bonds the option, until April 1 next, which no doubt will be availed of, of exchanging their bonds for the new loan.

"During the past year 1,000 additional freight cars were placed upon your southwestern lines, under the car-trust arrangement explained in previous reports, making in all 3,500 eight-wheeled coal cars, 3,406 box and other freight cars, and 1,308 oil tank cars added to your equipment east of Pittsburgh, and 2,000 box cars to your western equipment.

"The necessary steps have also been taken to secure 2,000 additional box cars and 3,000 hopper gondolas for the lines east of Pittsburgh, upon 5 per cent. certificates of the Railway Car Trust of Pennsylvania.

"The car-trust cars on the lines east of Pittsburgh represent a cost of \$4,499,000; west of Pittsburgh, \$955,000; total, \$5,454,000, on account of which \$1,893,000 had been paid up to Dec. 31, 1879, leaving \$3,561,000 certificates outstanding.

"The profits from the Empire Line since its purchase in October, 1877, have been sufficient to pay interest on its cost, redeem \$605,000 of the \$2,550,000 of certificates issued in payment, and leave a surplus of \$276,202.29.

"The percentage of expenses to gross receipts for four years past was as follows:

	1879.	1878.	1877.	1876.
Penna. R. R., Main Line.....	51.71	52.91	55.47	58.70
Penna. R. R., including branches.....	54.05	53.75	56.63	59.90
United N. J., Main Line.....	64.57	65.50	69.50	58.30
United N. J., including branches.....	67.93	69.40	71.30	56.90
Del. & Harlan Canal.....	46.97	55.50	53.30	50.40
Phila. & Erie.....	68.90	70.00	64.60	65.27

"The United New Jersey Main Line is the 89 miles between Jersey City and West Philadelphia. It is to be regretted that we have not the earnings of that line and of the main line between Philadelphia and Pittsburgh stated separately. The gross earnings per mile of the last named line (Philadelphia-Pittsburgh) are given, however, at \$52,786.09, an increase of \$3,935.77, or 7½ per cent., over the preceding year.

"The condensed statement for all lines east of Pittsburgh and Erie, 1,806 miles of railroad and 66 of canal, is as follows:

	1879.	1878.	Increase.	P. c.
Gross earnings.....	\$34,620,279	\$31,636,735	\$2,983,544	9.4
Expenses.....	20,382,740	18,468,904	1,913,746	10.4
Net earnings.....	\$14,237,539	\$13,167,741	\$1,069,798	8.1
Rentals and interest on equipment.....	2,129,010	1,684,190	444,820	26.4
Net balance.....	\$12,108,529	\$11,483,551	\$624,978	5.4

TRAFFIC.

The traffic for the year of all lines east of Pittsburgh and Erie was as follows:

	1879.	1878.	Increase.	P. c.
Passengers carried.....	13,602,401	12,792,305	810,096	6.3
Passenger mileage.....	314,200,080	282,725,524	31,474,556	7.4
Tons freight moved.....	24,970,672	19,121,877	5,848,795	30.6
Tonnage mileage.....	3,061,478,249	2,431,807,650	629,670,599	25.9

"In connection with the passenger business, it may be stated that during 1879 there were handled 1,070,451 pieces of baggage, as against 972,008 in 1878, and that no baggage was lost during the year. The entire payments for old claims and damaged baggage amounted to \$413.31. *

"The number of tons of freight moved in 1879 over your Main Line and branches, including 773,461 tons of fuel and other materials for the company's use, was 14,457,502 tons, embracing 6,379,995 tons of coal. For the previous year,

11,627,228 tons were moved, showing an increase of 2,830,274 tons, or about 24.3 per cent., while the increase in coal tonnage was 1,372,184 tons.

"The most marked increase was in the mileage of local freight westward, which amounted to 46.99 per cent. The tonnage mileage of through freight westward was also largely increased, the percentage being 33.53. The total tonnage mileage of through and local freight eastward was 1,742,439,006, and westward 394,269,881, an increase of 19.88 per cent. in the former, and 45.30 per cent. in the latter. It will thus be seen that the company earned the larger portion of its revenue from the transportation of a large volume of traffic at a small profit; while the heavy increase in local business shows that it is carefully fostered, and is not burdened for the benefit of through traffic. Of the 13,684,041 tons moved upon the Main Line and branches, 2,076,540 were through, and 11,607,501 local freight. The coke shipments eastward increased 90,708 tons, or 51.87 per cent., and westward 336,993 tons, or 56.25 per cent. This traffic continues to grow rapidly, and the shipments from the Connellsville region show an increase of 436,699 tons, or 55 per cent. compared with 1878. The total coal and coke shipments for 1879 were 6,379,995 tons, as against 5,007,811 tons in 1878. The oil traffic shows an increase of 547,616 barrels. There was also a very large increase in the movement of grain and other western produce over the Main Line."

The receipt and cost per unit of traffic on the various lines were as follows, in cents:

	Penna. R. R.	United N. J.	Phila. & Erie.	All lines.
Passenger.....	1,092.5 miles.	425.5 miles.	288 miles.	1,806 miles.
Receipt.....	1879. 1878.	1879. 1878.	1879. 1878.	1879. 1878.
Cost.....	2.281 2.357	2.173 2.201	2.944 3.029	2.255 2.309
Net.....	1.082 1.793	1.641 1.521	2.923 3.048	1.709 1.712
Ton mile.....	0.589 0.564	0.532 0.680	0.621 0.619	0.546 0.597
Receipt.....	0.799 0.918	1.473 1.436	0.512 0.628	0.824 0.939
Cost.....	0.427 0.483	1.012 1.032	1.354 0.445	0.480 0.545
Net.....	0.369 0.435	0.461 0.384	0.158 0.183	0.344 0.394

* LOSS.

Some explanation may be needed as to the wide differences here shown. On the United New Jersey a very large part of the business is carried but short distances, and even on the through business there is but a short haul with heavy terminal expenses. On the Philadelphia & Erie, on the other hand, most of the freight is carried long distances in trains run at low speed and with few passenger trains to interfere with the freight traffic; usually only one terminal charge, and that a light one, or none at all. Hence it is that this division earns a profit on an average freight rate, but little more than half the average cost on the New Jersey lines; its business is chiefly in coarse freights, cheaply handled and moved at low speed.

"The increase of expenses is mainly in the motive-power department and that of conducting transportation, due to the largely-increased tonnage.

"There were used in renewals upon the Main Line and branches, 6,923 tons of steel rail and 569,843 ties.

"Fifty locomotives were rebuilt during the year, and also 16 passenger, 1 postal, 4 combined passenger and baggage cars, 428 box, 337 gondola, 73 stock and 62 oil-tank cars.

"The transfer of the terminal work at Jersey City and New York from the Union Line Bureau to the New Jersey Division caused a large increase in its expenses, which was, however, more than met by the increased revenue. Large betterment expenditures were also charged directly against earnings, and the operating expenses necessarily augmented by the increased volume of traffic. The work of ballasting this division with stone is being steadily prosecuted, with the view of bringing the entire property up to the standard of the M-in Line. During the year 3,458 tons of steel and 270,957 ties were put in the track.

"On the Philadelphia & Erie Division 6,094 tons of steel and 143,071 ties were used in renewals. The increased expense on that division was due to increased traffic, it having carried 1,300,000 more tons than in 1878, the gain being principally in coal, petroleum, lumber and agricultural products.

"As a material element in the low cost of transportation, it should be noted that the mileage of engines increased but 12.32 per cent. on the three divisions east of Pittsburgh, while the tonnage mileage increased over 25 per cent."

CONTROLLED COMPANIES.

The Pennsylvania Canal carried 806,522 tons, an increase of 137,815 tons. Gross earnings, \$282,767.49; net, \$106,320.85; interest charges, \$185,400, leaving net loss, \$79,079.15.

The Susquehanna Coal Company earned \$1,559,361.54, and showed a surplus of \$10,622.06 after paying all charges. Tons coal mined, 631,664.

The Summit Branch Company earned \$909,617.52, but showed a loss, after paying all charges, of \$47,006.57. Tons coal mined, 251,327.

The Lykens Valley Company, with gross receipts of \$514,301.05, showed a net loss of \$46,319.62. Tons coal mined, 170,597.

The Mineral Railroad & Mining Company earned \$802,233.82, and had a surplus of \$1,090.12 over all charges. Tons coal mined, 293,164.

The four coal companies mined 1,346,752 and sold 1,351,957 tons coal, an increase of 265,940 tons mined, and 264,110 tons sold. The average price per ton received was \$2.678, against \$3.132 in 1878, a decrease of 45.4 cents.

The operations of the controlled railroad lines may be expressed as follows:

	Gross earnings.	Net earnings.	Profit or loss after paying all chgs.
North. Central.....	\$4,107,948.82	\$1,246,006.85	Prof. \$163,994.65
Balt. & Potomac.....	689,772.05	173,570.36	Loss. 98,746.97
Rich. & Danville.....	1,739,629.80	782,403.89	Prof. 187,565.23
Cumberland Valley.....	503,597.72	264,040.02	Prof. 38,790.24
Allegheny Valley.....	1,745,316.77	761,835.50	Loss. 808,114.05
Pitts., Va. & Ch'ton.....	154,574.35	27,084.94	Loss. 85,112.71
West Jersey.....	586,178.23	253,812.24	Prof. 55,873.24
Camd. & Phil. Ferry.....	140,436.56	60,261.66	Prof. 48,987.77

Charges on the Cumberland Valley road include 10 per cent. dividends on stock. The Alexandria & Fredericksburg road still continues in the hands of trustees.

LINES WEST OF PITTSBURGH.

On all the lines owned or controlled west of Pittsburgh and worked under the organization of the Pennsylvania Company, the traffic was as follows:

	1879.	1878.	Increase.	P. c.
Passeng'rs carried.....	8,201,505	8,041,764	219,891	2.7
Passeng'rs mileage.....	209,515,697	247,725,160	22,240,531	8.9
Tons freight moved.....	20,166,334	16,871,837	3,294,497	19.5
Tonnage mileage.....	2,272,716,185	1,814,100,152	458,616,033	25.3

The financial results of the working of these lines were as follows:

	1879.	1878.	Increase.	P. c.
Gross earnings.....	\$25,742,297	\$23,700,228	\$2,042,069	8.2
Expenses.....	15,305,534	15,148,805	156,729	0.8
Net earnings.....	\$10,436,763	\$8,605,423	\$1,831,340	21.3
Rentals and all charges.....	8,612,675	7,621,234	991,441	13.0
Net profit.....	\$1,824,088	\$984,189	\$839,899	85.3

The other lines west of Pittsburgh, in connection with the company has assumed liabilities, or which it controls through the ownership of stock, but which are worked through their own individual organizations, are the St. Louis, Vandalia & Terre Haute Railroad, Indianapolis & St. Louis Railroad, St. Louis, Alton & Terre Haute Railroad, Grand Rapids & Indiana Railroad, Cincinnati, Richmond & Fort Wayne Railroad, Cleveland, Mount Vernon & Delaware Railroad, and East St. Louis & Carondelet Railway. The aggregate earnings of these lines were as follows:

	1879.	1878.	Inc. or Dec.	P. c.
Gross earnings.....	\$5,007,414	\$4,348,649	I. \$658,765	15.1
Expenses.....	3,562,908	3,437,405	I. 125,503	3.7
Net earnings.....	\$1,444,506	\$911,244	I. \$533,262	58.5
Rentals and interest.....	2,013,017	1,909,857	I. 103,160	5.4
Loss.....	\$568,511	\$908,613	D. \$340,102	43.6

The net result of the Western lines was as follows:

Pennsylvania R. R. Co.'s proportion of above loss...	\$200,448.09
Less Grand Rapids & Indiana deficit, represented by coupons held.....	58,685.85
Balance.....	\$141,762.24
Profit above stated.....	1,824,088.36

Net profit on all lines west of Pittsburgh. \$1,682,326.12

This is a net gain of \$965,806.05 over the preceding year, and a large gain over any previous year.

During the year, \$210,000 were advanced to pay interest on Grand Rapids & Indiana bonds, being \$75,250 less than in 1878. Land receipts were \$338,230.34. The assets of the Land Department are \$591,459.26, besides 633,675 acres of land, making good security for advances.

It will be noted that the above result is reached after providing for the interest upon all the bonds of the Pennsylvania Company and the second-mortgage bonds of the Pittsburgh, Cincinnati & St. Louis Railway Company. By reference to the general account of the former company, it will also be seen that it paid off during the year \$600,000 of its debentures, leaving \$6,400,000 outstanding.

Neither the Pennsylvania Company nor the Pittsburgh, Cincinnati & St. Louis Railway Company has any bills payable.

Under the operation of the sinking fund for the redemption of the 6 per cent. bonds of the Pennsylvania Company, secured by the special guaranteed stock of the Pittsburgh, Fort Wayne & Chicago Railway Company, \$96,000 were purchased and canceled in 1879.

The sum of \$316,499.71 was paid into sinking funds during 1879 for the redemption of existing mortgages on the leased lines west of Pittsburgh. Of this amount \$104,100 were paid into the fund provided for the extinguishment of the first and second mortgage bonds of the Pittsburgh, Fort Wayne & Chicago Railway Company. Of these bonds, \$2,331,000 have been redeemed, but they are now held so much above par that it is impossible for the trustees thereof to purchase the same at any reasonable figure for the sinking fund. For the protection of the interests of the bond and stockholders of that company, and to prevent the further accumulation of moneys in this fund, it will be necessary that the trustees be authorized to invest the same in other first-class securities, and this matter will be urged upon the attention of the proper parties.

During the year \$775,000 of the coupon bonds of the Pittsburgh, Cincinnati & St. Louis Railway Company have been converted into registered bonds, in accordance with the authority conferred by act of Assembly, and the notice given by the trustees, making the total amount converted to the end of 1879, \$2,711,000.

The holders of the 7 per cent. coupon bonds of the Steubenville & Indiana Railroad Company are also availing themselves of this privilege, \$319,000 having been so exchanged during 1879.

The amount expended for betterment purposes during the year on all the above lines was \$388,548.27, in addition to new equipment, purchased by the Indianapolis & St. Louis Railroad Company, at a cost of \$130,477.60.

The Pennsylvania Company received \$8,374.15, leaving a balance due on account thereof and of expenditures formerly made of \$427,511.81.

The renewal of your Western lines in steel has been steadily continued throughout the year; 7,711 tons were put into your northwestern system, of which 3,329 were placed in the Western Division of the Fort Wayne road, leaving but 16 miles to be renewed to complete the entire line between Pittsburgh and Chicago in steel. On the main line of the Cleveland & Pittsburgh road 1,963 tons were laid. On the Southwestern lines 13,560 tons were laid during the year, of which 2,814 were put into the Little Miami road, 1,802 in the Jeffersonville, Madison & Indianapolis road, and 8,319 in the Columbus, Chicago & Indiana Central. Two-thirds of your Northwestern lines and about 30 per cent. of your Southwestern lines have now been renewed in steel.

Of the Fort Wayne line, 207 miles are full ballasted with cinder and stone, and the same work is being done on the Cleveland and Pittsburgh road. By reason of these betterments and of the improved condition of their equipment, the earning power of these lines has been materially increased and their percentage of expenses reduced, so that the Pittsburgh, Fort Wayne & Chicago Railway shows a cost per ton per mile for the past year of 4.38 mills. Wooden bridges are being replaced with iron, engines of greater power substituted for the lighter classes, and other steps taken to bring your Western lines up to the highest standard, and fully provide for their increasing traffic.

The negotiations between your company, the Pittsburgh, Fort Wayne & Chicago, the Chicago & Alton, and the Chicago, Milwaukee & St. Paul Railway companies for the construction of a joint passenger depot at Chicago, on Canal street, between Madison and Van Buren, have been consummated, and the work will be completed this year. This improvement is much needed, and will be so made as to give ample facilities for handling the traffic of the lines referred to, and such other companies as may be admitted thereto. Additional ground has also been purchased, so as to provide for four tracks from the depot to the south branch of the Chicago River, and thus furnish facilities absolutely needed for the freight traffic.

At Toledo the freight depot required by the contract entered into with that city in connection with the Toledo & Woodville road is now completed and in use, and the passenger depot will be finished in a few months. The bridge over the Maumee River at that point is also being renewed in iron.

The aggregate amount of steel rails laid on all the lines owned, controlled or operated by the company east and west of Pittsburgh in 1879 was 53,272 tons.

In the litigation connected with the lease of the Columbus, Chicago & Indiana Central Railway to the Pittsburgh, Cincinnati & St. Louis Railway Company, a decree has been recently rendered by Judge Harlan, of the United States Circuit Court. It will be remembered that before the institution of legal proceedings by the Pittsburgh, Cincinnati & St. Louis Railway Company, to compel the Columbus, Chicago & Indiana Central Railway Company to perform the covenants of the lease, the trustees of the consolidated mort-

gage upon that property applied to the court, and had themselves appointed receivers of the net revenues of the road, procuring an order, however, that such appointment should not be considered an interference with the possession and operation of the same by the Pittsburgh, Cincinnati & St. Louis Company. Three important questions were thus presented for determination, as follows: First, Whether the defect of power to make the lease referred to in the amended contract of February 1, 1870, had been cured. Second, Whether the proceedings instituted by the trustees amounted to an eviction; and Third, Whether the Columbus, Chicago & Indiana Central Company had performed its covenant to arrange, provide for and adjust its indebtedness, by making the reduction agreed upon in the amended lease of Feb. 1, 1870. While holding the lease to be valid and subsisting, the Court adjudged the Columbus, Chicago & Indiana Central Railway Company to have been in default upon the last point, and say in express terms that the lessee was justified in withholding and suspending further payment, and in commencing legal proceedings to enforce the terms of the lease, or its cancellation by the Company. Under the previous rulings of the Court, the Columbus, Chicago & Indiana Central Company has been given until Jan. 1, 1880, to reduce its debt, as stipulated in the lease, to \$15,821,000, and this requirement the Court adjudged to have been complied with, with the exception of the amount covered by the Pullan decree, which, it may be remembered, affects the portion of the leased line between Richmond and New Castle, in the State of Indiana. In order to protect the interests of the lessee in this piece of road, the Columbus, Chicago & Indiana Central Company is required to deposit \$1,000,000 of securities, subject to the order of the Court. The rental found to be due up to Jan. 1, 1880, under this decree, is about \$2,400,000, being a reduction of \$1,000,000 on the amount claimed by the Columbus, Chicago & Indiana Central Railway Company. As the questions involved in this litigation are of great importance, upon which a decision of the Court of last resort is very desirable, and as the amount at issue is large, this company has appealed to the United States Supreme Court, where the questions of the original validity of the lease, its termination by subsequent legal proceedings, the sufficiency of the action of the Columbus, Chicago & Indiana Central Company in reducing its debt, and of the manner in which it has performed that stipulation, and the amount of rental really due, will all come up for final adjudication. It will be remembered that the Pittsburgh, Cincinnati & St. Louis Company has always insisted, as an essential condition of the lease, that the Columbus, Chicago & Indiana Central Company was bound not only to reduce the amount of its fixed debt to \$15,821,000, but also to arrange, adjust and provide for the outstanding sectional bonds, maturing at various dates by converting the same into the consolidated bonds issued by the Columbus, Chicago & Indiana Central Company. It is probable that some years will elapse before the case will be finally determined.

The summary for all lines east and west of Pittsburgh is as follows:

	1879.	1878.
Passengers carried.....	21,863,966	20,833,979
Passenger mileage.....	583,776,686	540,000,090
Tons freight carried.....	45,137,000	35,963,814
Tonnage mileage.....	5,334,194,434	4,245,907,808
Gross earnings.....	\$60,362,575.67	\$55,426,962.93
Expenses, rentals and interest.....	35,639,704.99	33,611,634.09
Net balance.....	\$24,722,780.68	\$21,815,928.84

The net result shows an increase of \$2,906,851.84, or 13.3 per cent.

GENERAL REMARKS.

For the trust fund created in 1878, the sum of \$700,000 has been appropriated and securities bought whose par value is \$775,100, and which yield 7½ per cent. on the investment.

The insurance fund, which appears in the general account of the nominal value of \$10,000, has cash and securities amounting to \$663,191.56, an increase of \$79,317.56 during the year.

It having come to the knowledge of your board that offers had been made by other parties to the city of Philadelphia, for the purchase of the 59,149 shares of your stock held by the Commissioners of the Sinking Fund, it was deemed wise for the protection of your interests, and to keep this stock out of the hands of parties whose interests might be unfriendly thereto, and to those of Philadelphia, to purchase the same at par. The transaction was closed upon that basis, and the stock having been paid for, is now held in trust as an asset of your company.

The board take pleasure in announcing that the relations existing between your company and its competing trunk lines continue to be of the most friendly character. It is the earnest desire of your management to maintain harmonious relations with all competitors with whom it may have business relations, and to cooperate in securing proper compensation for the work done, and they are at all times ready to make fair and equitable arrangements having that end in view; they, of course, reserve the right to secure from time to time such tributaries to their main lines as will increase their revenue and protect your best interests.

The pooling system heretofore in force on west-bound traffic from New York has been extended to Baltimore, Philadelphia and Boston, and has worked to the satisfaction not only of the railways, but of the shippers of the various lines, who have thereby been placed on an entire equality, and an end put to the drawbacks and discriminations that formerly prevailed through the policy pursued by competing lines.

This pool, or revised business arrangement, is under the general charge of Mr. Albert Fink, as Commissioner, a gentleman thoroughly versed in all matters connected with railway service and transportation, and who enjoys to a marked degree the confidence of the Trunk lines and shippers at large.

With the same view, the lines from Chicago, Cincinnati, Louisville, Indianapolis, St. Louis, and other commercial centres of the West have, under the supervision of a Joint Executive Committee, adopted the same system, with equally satisfactory results; the traffic being divided among the roads in the proportion to which they have been fairly entitled by the business of preceding years, and each road therefore securing its fair share of traffic, free of commissions and other outside expenses.

The accomplishment of this desirable result has been much aided through the establishment of a Board of Arbitration, consisting of Mr. Charles Francis Adams, Jr., Mr. David A. Wells and Mr. John A. Wright, all gentlemen of great experience and ability, whose function it is to settle the differences that may arise between the competing lines in regard to the division of tonnage and other matters, and in this way prevent the dissensions that were formerly so injurious, not only to the roads but to the public. As a consequence of these measures the great through traffic of the country is now carried at regular and moderate prices; and in view of the apprehension that seems to have been felt in some quarters that the result of pooling would be exorbitant and unreasonable rates, your attention is especially directed to the fact that the charge made per ton per mile in 1879 was below the low

figures of the preceding year, thus evidencing the desire and intention of the railways to look to a large tonnage and small profit for the revenue upon the capital invested therein. It is hoped, therefore, that any legislation upon this question will recognize the practical results already attained, and the means by which they have been reached, and that none will be enacted which will injuriously affect the large interests represented in the railways of the country. Some of the measures that have been introduced into Congress have evidently been framed without a full understanding of the question, as they would legalize the worst forms of discrimination not only as between shippers and between different localities, but also against the local traffic of the country. It is believed, if an able and experienced commission were appointed to examine into this whole subject and report the result of their investigation to Congress, with such recommendations as they might deem pertinent in relation thereto, that in this way intelligent action could be had, and the vast inter-state commerce of the country properly regulated without unwise and injurious results, either to the corporate interests involved or to the general commercial interests of the country. It is hoped when such action is had, that in order that equal and exact justice shall be done to all the various interests, a provision will be inserted requiring the concurrent action of the several states which have created the different railway companies and conferred upon them their corporate powers.

The litigation referred to in the last report as existing in Pennsylvania, in connection with the petroleum traffic, has been satisfactorily adjusted. But the transportation of this traffic has been further complicated by the establishment, in June last, of a pipe-line from the oil regions to Williamsport, there connecting with a new competing line to the seaboard at New York and Philadelphia. Your board, in consideration of the large amount of capital invested in facilities for transporting this traffic, and in the absence of any satisfactory guarantee against the multiplication of such pipe-lines, believed it to be their duty to take all proper means to preserve the business to your railways. The result was such a modification of the rates that, while covering the cost of moving this traffic, they yielded but little net profit during the latter half of the year. But while the parties interested in the Tidewater Pipe-Line thus succeeded in disturbing the oil rates, it was clearly demonstrated that your road could successfully compete therewith for the transportation of this traffic. And while your board was willing to recognize the claim of the new line to a fair share of the business, they did not feel themselves authorized to yield to the demand made by the representatives of that interest for an undue percentage of the oil destined to the seaboard. The total amount of crude oil carried during the year by all routes to Philadelphia, New York and Baltimore, including that of the Tidewater Pipe Company, limited, was 7,405,370 barrels, or a little over 20,000 barrels per day. Of this the Pipe-Line demanded 10,000 barrels as its proportion, although it has connection with the Bradford District alone, and has no rail outlet to Baltimore, while the three northern trunk lines all connect with the entire oil district of Pennsylvania, and each one of them has a capacity for transporting oil certainly much greater than that claimed for the Pipe-Line. The negotiations between the Chairman of the trunk lines and the President of the Central Railroad of New Jersey, and other parties connected with that line, have, however, resulted in an adjustment of the points of difference, and a general basis has been agreed upon, that, it is believed, will give to each party its fair proportion of the competitive oil traffic. It may be noted here that, in addition to the crude oil transported to the seaboard, there were carried also from western refineries, to which neither the Tidewater Pipe-Line nor its rail connection has access, 2,859,027 barrels of refined oil.

In order to secure to your lines an increased haul to the seaboard of the oil and other traffic from the Philadelphia & Erie Railroad destined to New York and points east thereof, a very favorable arrangement has been made with the National Docks Railway Company, a corporation organized to construct a road about two miles in length from your line near Bergen Point to the yards of the National Storage Company, at Communipaw, to which a deep water channel is being made from the ocean, which will enable the largest vessels to load and discharge at their docks. Such contracts have been made with the latter company as will secure for your traffic all needed facilities at that point on the most favorable terms. The construction of this road has been somewhat delayed through litigation; but it is believed that this obstacle is but temporary, and that your company will soon enjoy an increased revenue through the competition of this railway and its important terminal facilities.

The board take pleasure in announcing that your claims against the county of Allegheny, growing out of the riots of 1877, have been compromised, and that the sum of \$1,000,000 has been received in full settlement of the losses incurred by your company and the lines controlled by it in the destruction of property at Pittsburgh. The claims of individual shippers and other corporations against the county are being generally adjusted upon the same basis as that arrived at with your company. Your board, in view of all the circumstances of the case, believe the settlement to have been a wise and proper one for your interests, and at the same time very liberal to the citizens of Allegheny County. In this connection they desire especially to recognize the valuable services of Mr. John Scott, your General Solicitor, and of the counsel of the company at Pittsburgh, Messrs. Hampton and Dalzell, in bringing these negotiations to a successful issue.

During the past year your lines and their equipment have been fully kept up to the requirements of the traffic thereon, and such changes made in various organizations as were deemed to be the best interests of the shareholders. The Pennsylvania & Delaware Road being unable to meet its operating expenses, the lease of the same was cancelled in accordance with the provisions thereof; and the road having been foreclosed under mortgage, that portion extending from Pomeroy, on your main line, to the Delaware state line, has been reorganized by its purchasers as the Pomeroy & State Line Railroad. Similar steps will probably be taken with other branch roads controlled by the company, so as to put them on the proper basis for the most economical and efficient operation.

The lease of the Newry Railroad was also surrendered as of Aug. 3, 1879, in accordance with the terms of the lease, and your company has since that date been operating the same under a temporary agreement with its owners.

The Lewisburg, Centre & Spruce Creek Railroad was also foreclosed under mortgage, and has since been re-organized as the Lewisburg & Tyrone Railroad Company.

In the state of New Jersey, in order to place under one organization the road to Sea Girt, the Freehold & Jamesburg Agricultural Railroad, the Squankum & Freehold Marl Company, and the Farmingdale & Squankum Village Railroad Company, have been consolidated into the Freehold & Jamesburg Agricultural Railroad Company, and a consolidated mortgage authorized for \$578,000, for the purpose of retiring the outstanding sectional bonds and improving the property. The Pemberton & New York Railroad, having been purchased at a sale of the same, under a foreclosure of the mortgage, has been re-organized; some further exten-

sions of this line may possibly be required to reach the growing summer resorts upon the New Jersey coast.

"Owing to the construction of a parallel line, the revenue of the Mercer & Somerset Railway, a purely local road, has for a number of years past fallen off, until its expenses being in excess of its receipts, your board did not feel justified in further continuing its operation. No other parties being found willing to purchase and operate the line, your board directed the mortgage upon the same to be foreclosed, the train service to be discontinued and such further steps taken as might be for your best interest.

"In order to give your company a proper connection with West Chester, and to meet the threatened competition of other lines, it was deemed advisable to purchase from the West Chester & Philadelphia Railroad Company the branch, nine miles long, extending from West Chester to your main line at Malvern. It is now being operated by your company, but it has been found advisable to make considerable change in the alignment of the road, and to make the connection at Frazer's, three miles west of Malvern, thus using the main line for the additional distance. This work is being rapidly pushed to completion. A profitable business is being secured through this extension, and the revenue of your company will thus be increased at a comparatively small outlay.

"The board have had under consideration for some years past the question of extending your line from West Philadelphia, in accordance with the power conferred by its charter and the supplements thereto. In order to preserve and increase the passenger traffic to which your line is justly entitled, and furnish to the traveling public the necessary facilities for their prompt transportation, it was deemed advisable to take the needful steps to establish a passenger depot near the new public buildings at Broad and Market streets, and extend your road at once to that point. In order to avoid the obstruction of traffic upon the streets crossed by this road, it was necessary to elevate the same above grade, the City Councils giving their full assent thereto, and to purchase the real estate lying between the Schuylkill River and the new depot, and between Filbert and Jones streets. This line will require a bridge across the river at Filbert street, the piers of which are now in process of construction. The entire line will be completed within the present year, and will give such facilities for traffic to and from New York, and to and from all local and through points upon your lines, that your traffic and revenue cannot fail to be correspondingly benefited. It is proposed to utilize the spaces under the tracks for the storage of coal, lime, and other bulky products, and in this way to furnish additional terminal accommodations for the increasing business of your company. The entire cost of this improvement, including real estate, freight and passenger depots, and other facilities connected therewith, is estimated at three millions of dollars.

"The board have now under consideration the construction, in connection with the Lehigh Valley Railroad Company, of a road from a point on the Connecting Railway, at or near Ridge Avenue Station, in the city of Philadelphia, by way of Germantown, Chestnut Hill, Conshohocken and Norristown to Bethlehem. If the owners of property along the line will promptly grant the needful right of way and depot grounds, and the communities that will be benefited by its construction will give proper facilities for passing through their limits, this road can be made a very important highway both to them and the city of Philadelphia, as it will give advantageous connections with the country tributary to the Lehigh Valley Railroad and its connecting lines, and will furnish for the traffic thus secured greatly increased facilities. Through this line also the manufacturers and all local consumers in Philadelphia will have access to the valuable coal fields of the Lehigh and Wyoming regions, and will, it is believed, through the action of the Lehigh Valley Company, be able to get their anthracite coal at prices not exceeding those charged in the city of New York, or at other competitive manufacturing points east thereof. It will open to your extended system of lines a large manufacturing and densely populated district of the city of Philadelphia and adjacent country, and in addition thereto throw a large additional traffic on the connecting road, and the other lines owned by your company, reaching your various termini in Philadelphia, which can readily accommodate the movement of the traffic of the new road, and thus earn an increased revenue. The depot and other property for handling the freight business will, of course, be furnished by the new company, your company simply supplying, for a proper remuneration, the track facilities to and from the same. The Filbert-street Extension will, also, undoubtedly be found of great value in connection with the passenger traffic of the Bethlehem Line, and in increasing its usefulness to the commercial and other interests of Philadelphia and the country adjacent thereto. It is hoped that the negotiations in reference to the construction of this line will soon be consummated, and the road opened at an early day.

"In order to better accommodate the traffic to and from your Main Line and the Delaware front, and also to develop traffic along the Schuylkill front, it was deemed advisable to complete a connection between your line terminating at Market street and your Delaware Extension, by constructing about one mile of new road, thus connecting your valuable termini in the southern part of the city with your Main Line, which had heretofore only been done through the Junction Railroad, and to which a large amount of tolls has been paid on your traffic. In constructing this road, as also in the original work upon the Delaware Extension, it was necessary to use for the right of way a portion of the marsh land belonging to the Almshouse property. As some question seems to have been raised in reference thereto, the Board desire to say that for such use the Company is at all times ready to make a proper compensation, should the City of Philadelphia not determine that she has already been amply reimbursed by the benefits that have accrued through this line to both her local and foreign commerce."

Appropriate reference is made to the deaths of Messrs. Kingston, Derbyshire and Stecher, and the retirement of Mr. Gardner.

"The board desire in this connection to tender their thanks to the employees for their fidelity and efficiency displayed in the discharge of their duties, and to express their satisfaction at the near approach of the period when the company will be able to advance their compensation. Owing to the large reductions in freight rates necessary to keep in operation the manufacturing establishments upon your lines and to meet the competition of other roads, the company did not until near the close of 1879 experience in any marked degree the benefits resulting from the improvement in the industrial interests of the country. But in the belief that the net earnings during the current year will furnish sufficient funds to meet its necessary expenditures, and also permit an increase of wages, your board have decided to make an advance, not later than the first of April next. They desire also to convey the assurance that they will continue to look after the interests of the employees, and take such further action from time to time as the condition of the company may warrant.

"The board beg leave to say in reference to the resolutions submitted to them at the last annual meeting for report, that the subjects embraced by the same have received their careful consideration. That so far as the salaries of officers and employees of this company are concerned, they see no

reason of expressing a different opinion from that contained in the report of the committee of shareholders of March 25, 1878, which was submitted to and approved by the shareholders. This committee then reported that the number of the officers was not beyond the requirements of the company, and that the salaries in many cases were below those paid by other roads for like services. But in order to set at rest various reports that have been circulated from time to time, in regard to the salary of the Chief Executive Officer of the company, the board desire to state that the President, for supervising and directing the business of over 7,000 miles of railway and canal, and the large coal property of the company, receives a compensation of \$24,300 per annum, and that all salaries paid him by corporations controlled by your company for his services go directly into your treasury, and not to him personally. The compensation of the President could, of course, be pro-rated among the various companies, but the practical result would be the same, and under the present system his services and those of all the other general officers of your company are given without charge, to the economical and efficient management of the auxiliary lines in which you are so largely interested.

"The same Committee reported that the relations of the Adams Express Company to your company were simply those of shippers over your lines, except that your company assumes no responsibility upon their traffic, under arrangements alterable on short notice, the terms of which were a source of large profit to you. In this connection, it may be well to state that the net revenue received from the Express Company in 1879 showed an increase of more than \$75,000 over that received in 1878.

"In regard to the use of Pullman palace cars upon your lines, the Board desire to say that there are many questions to be carefully considered in connection with any change in the policy heretofore pursued by your company; and to their consideration the best judgment of the board will be given prior to expiration of the existing contract. The board would refer, in this connection, to the report of the Committee of Investigation appointed by the shareholders in 1874, who, it will be remembered, went over this subject very

carefully, and recognizing the difficulties therewith, and in view of all the questions involved, recommended that it be left with the board for the exercise of a wise discretion.

"In regard to free passes, the board would say that great care has been taken during the past year to confine their issue to the lowest possible point, and that a very great reduction has been effected. They will endeavor to still further limit this privilege, and to issue no free tickets except where the same may absolutely subserve the interests of the company.

"In response to another matter covered by the resolutions, the board desire to say that it is absolutely necessary to the efficient performance of the duties of your executive officers that special facilities should be given them for movement over your extended system of roads; and that it is very important that the directors should make at least an annual inspection of your lines for the purpose of acquiring an actual knowledge of their condition and needs. They believe that the inconsiderable expenditure consequent thereupon is amply warranted by the practical information thus obtained in regard to the management of your traffic and the facilities necessary for its proper accommodation.

"The board, in accordance with the instructions heretofore given, have taken the necessary steps to restrict the attendance at the meetings to the shareholders or their legal representatives, and also to reduce as much as possible the expense of the publication of the annual report.

"The board would say generally, in conclusion, upon the subjects covered by the resolutions, that the utmost economy has been observed in all departments of the service, and that no unnecessary expenditures have been permitted. They believe that the shareholders will be satisfied, upon reading this report, that their interests have been carefully guarded, and their property economically and efficiently administered during the past year, and that the management of the company will continue to make such further retrenchments as can be effected in any branch of the service. * * *

"The board desire, in conclusion, to express their thanks to the officers for their efficient administration of your property during the past year."

GENERAL ACCOUNT.		During the year 1879.	
		Increase.	Decrease.
Debit:			
To capital stock	\$68,870,200.00		
" First mortgage bonds due 1880	\$4,970,000.00		
" General mortgage bonds due 1910	19,990,760.00		
" Consolidated mortgage bonds due 1905	28,901,540.00		
" Navy-yard mortgage registered bonds due 1881	1,000,000.00		\$243,460.00
" Lien of the state upon the public works between Philadelphia and Pittsburgh, bearing 5 per cent. interest, payable in annual installments of \$460,000, applicable first to the interest and the remainder to principal; the original amount of which was \$7,500,000	4,091,675.70		246,147.68
" Mortgages and ground rents payable	1,304,779.91	\$10,500.00	
Accounts payable, viz.:			
To passenger and freight balances due other roads	\$394,472.08		133,227.43
" Pay rolls and vouchers for December, 1879, due in January, 1880	2,787,098.75	492,394.00	
" Bills payable	1,040,000.00	90,000.00	
" Cash, dividend due to stockholders unpaid	127,507.75	16,930.25	
" Dividend scrip of December, 1873, outstanding	1,893.61		235.00
" Sundry accounts due other roads	2,955,599.71	1,091,859.15	
		7,306,571.90	
" Appraised value of securities owned by the United New Jersey Railroad & Canal Co. and transferred with the lease of the works of that company	3,895,581.60		
" Equipment of road and canal owned by the United New Jersey Railroad & Canal Co. and transferred with the lease of the works of that company	3,410,004.53		370,750.00
" Fund for the purchase of securities guaranteed by the Pennsylvania Railroad Company, under trust created Oct. 9, 1878	\$700,000.00		
" Consolidated mortgage bonds redeemed and cancelled	343,480.00		
" Balance to credit of profit and loss	4,181,073.33	5,224,533.33	1,160,718.19
		\$148,983,049.97	\$2,834,437.50
Less amount of decrease			963,820.11
Total amount of increase			\$1,844,587.48
Credit:			
By balance standing on the books of the company for the construction of the Railroad between Harrisburg and Pittsburgh, including branches to Indiana, Hollidaysburg and Morrison's Cove; also branch to connect with the Pittsburgh, Virginia & Charleston Railroad; also, bridge over the Susquehanna River at Columbia, and branch from Columbia to York, in all 349 52-100 miles; also, the extension of the Pennsylvania Railroad to the Delaware River, including wharves and grain elevator (\$2,135,011.67), and the Filbert street extension to Fifteenth and Market streets, Philadelphia (\$30,410.61), and cost of stations, warehouses and shops on the whole road from Philadelphia to Pittsburgh	\$27,048,546.77	\$414,757.64	
" Balance standing on the books of the company for the purchase of the Philadelphia & Columbia Railroad	5,375,733.43		
" Balance to debit of equipment of road, consisting of 877 locomotives, 550 passenger cars, 174 baggage, mail and express cars, 16,198 freight cars and 1,544 road cars, including shop machinery, steamboats and car floats, and also including equipment of canal, consisting of schooners, barges and tugs	17,693,304.49	180,007.50	
" Cost of real estate of the company and telegraph line	9,857,554.91	592,688.25	
Total amount charged to construction, equipment and real estate accounts for the railroads between Philadelphia and Pittsburgh, comprising 1,089.70 miles of single track (exclusive of Harrisburg & Lancaster Railroad, 98.70 miles), including sidings, stations, warehouses, shops and shop machinery, telegraph lines, canal equipment, etc., etc.		\$59,075,139.60	
By cost of bonds of railroad corporations	\$23,520,578.15		\$1,947,313.92
" Cost of capital stocks of railroad corporations	31,723,967.46	\$1,025,077.54	
" Cost of bonds and stocks of municipal corporations, coal companies, canal companies, bridge companies and investments not otherwise enumerated	8,237,137.24		880,591.50
Total cost of bonds and stocks belonging to the company		\$65,441,682.85	
By managers of trust created by Pennsylvania Railroad Company, Oct. 9, 1878		703,000.00	600,000.00
" Insurance fund		10,000.00	
" Mortgages and ground rents receivable		29,735.00	104,170.00
" Amount expended for the purchase of anthracite coal lands, Hazleton, Hamilton, Eastwick and other tracts	792,315.41	218.55	
" Appraised value of securities owned by the United New Jersey Railroad & Canal Co., and transferred with the lease of the works of that company	3,895,584.60		
" Equipment of road and canal owned by the United New Jersey Railroad & Canal Co., and transferred with the lease of the works of that company	3,410,004.53		370,750.00
" Amount of fuel and materials on hand for repairs to locomotives, cars and maintenance of way, viz.:			
For the Pennsylvania Railroad	\$1,118,547.78		115,100.54
" United New Jersey Railroad & Canal	592,575.98		5,061.92
" Philadelphia & Erie Railroad	229,112.83		35,040.15
		1,845,236.69	
" Amount of bills and accounts receivable, and amounts due from other roads, including advances made to railroad corporations for construction and purchase of equipment used on their lines, viz.:			
Philadelphia & Erie Railroad Co.	339,358.95		21,904.42
United New Jersey Railroad & Canal Co. construction	263,418.18		44,973.01
" " " sinking fund and redemption account	1,026,380.00		239,470.00
" " " real estate	419,734.73		26,351.84
Other companies	5,888,246.40		445,424.08
		8,037,120.23	
" Cash balance in hands of the Joint Stock Bank, London, and other parties to pay coupons due in January, 1880		1,158,936.20	23,019.74
" Cash balance in hands of freight and passenger agents	\$2,009,097.80		443,330.88
" Cash balance in hands of Treasurer	1,029,808.03		372,036.32
		3,038,895.83	
		\$148,983,049.97	\$8,161,432.64
Less amount of decrease			6,316,845.16
Total amount of increase			\$1,844,587.48